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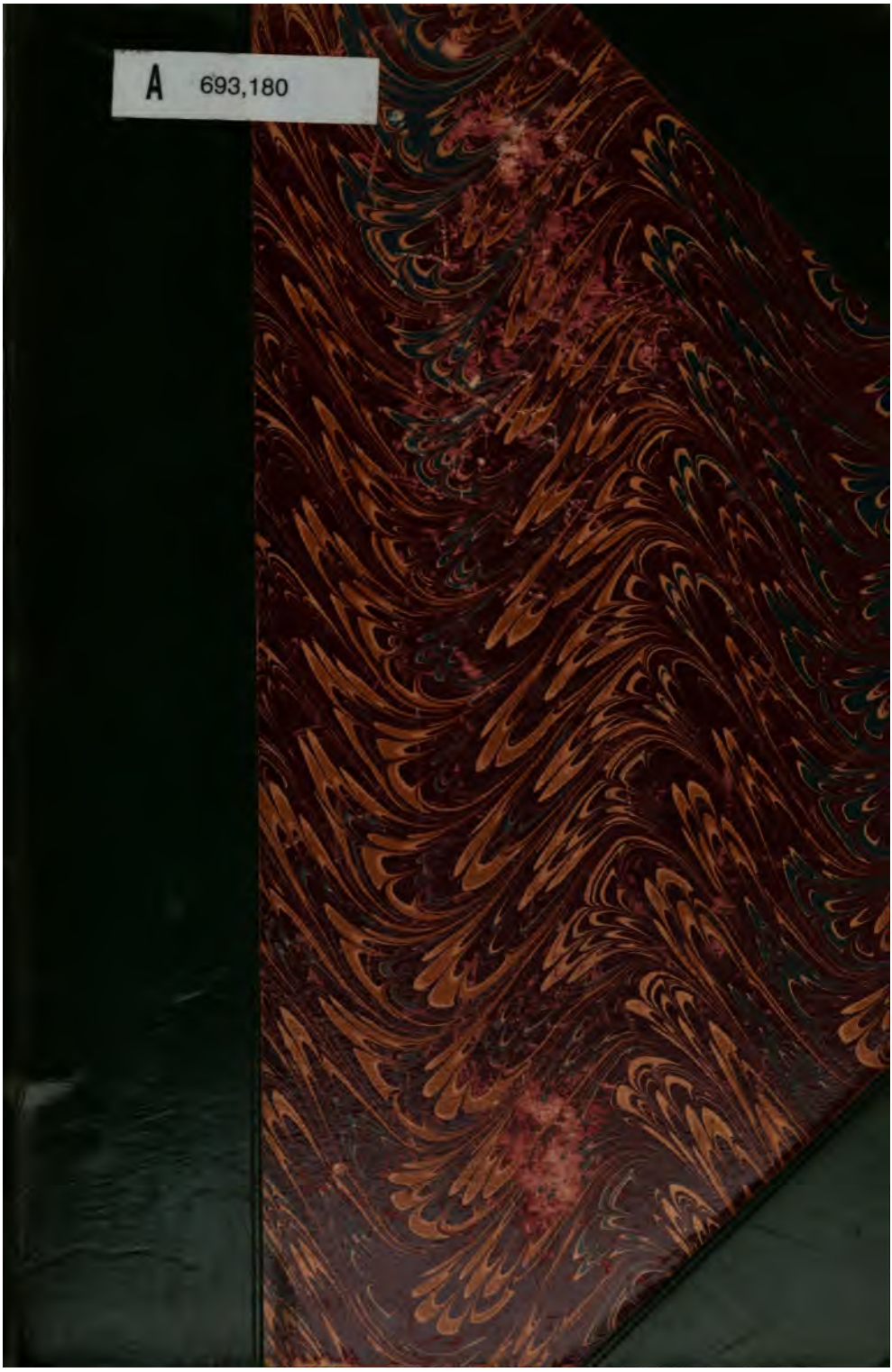

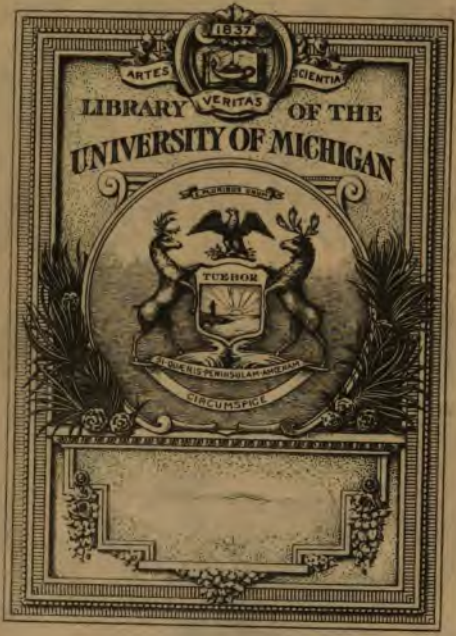
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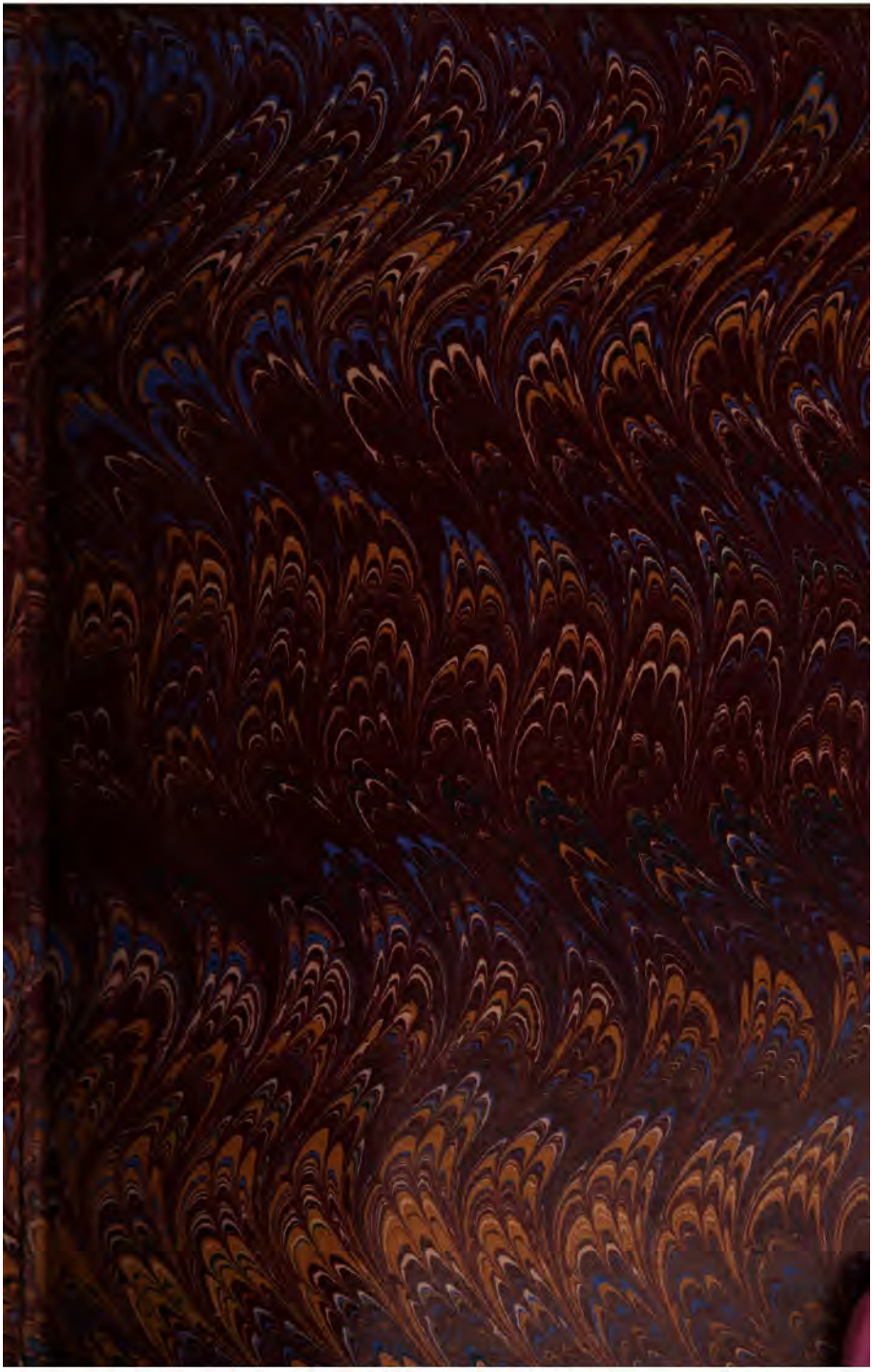

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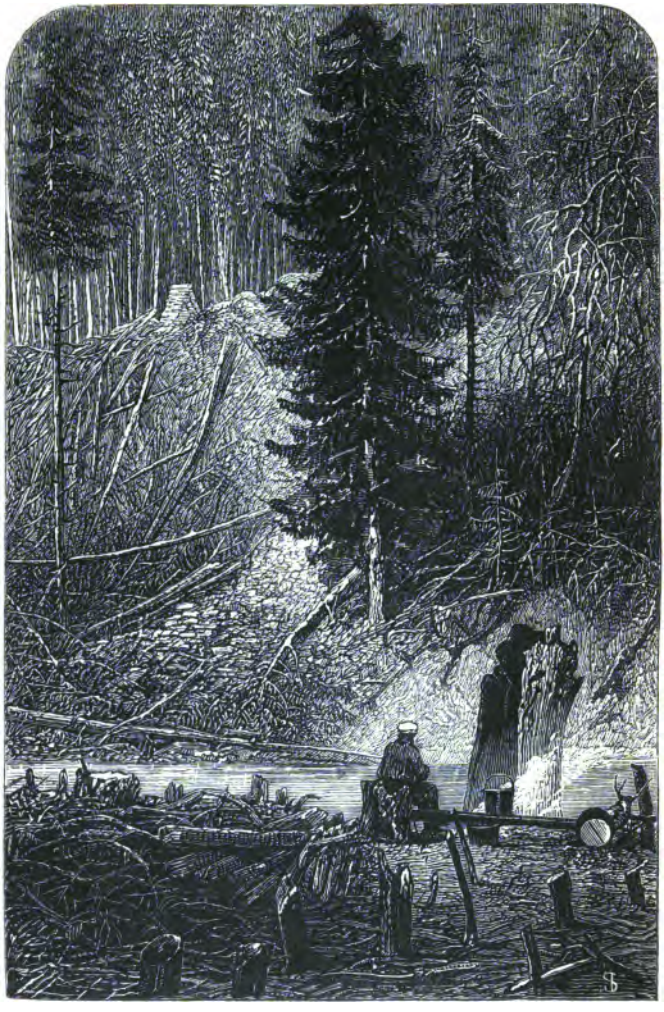

A CAMP ON THE BOUNDARY LINE.

UNIV. OF MICH.

THE NATURALIST

IN

VANCOUVER ISLAND AND BRITISH COLUMBIA.

BY

JOHN KEAST LORD, F.Z.S.

NATURALIST TO THE BRITISH NORTH AMERICAN BOUNDARY COMMISSION.

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ERRATA IN VOL II.

Page 23, line 2, *for* dry *read* dyed
„ 38, „ 18, *for* ruts *read* mountains
„ 105, „ 11, *for* clifts *read* cliffs
„ 120, „ 27, *for* uuite *read* quite
„ 141, „ 26, *for* illustration in vol. i. *read* frontispiece vol. ii.
„ 186, „ 19, *for* jaws they *read* the jaws are
„ 208, „ 10, *for* lynch *read* synch
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„ 223, „ 27, *for* risy *read* risky
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„ 250, „ 15, omit word page after illustration
„ 251, „ 22, * This illustration was unavoidably omitted, not being ready in time for publication
„ 255, „ 15, *for* Symukwateen *read* Syniakwateen
„ 267, „ 22, *for* SAYAS *read* HYAS. The letters N. S. to be omitted

VANCOUVER ISLAND
AND
BRITISH COLUMBIA.

CHAPTER I.

CALIFORNIAN GROUND-SQUIRREL—BURROWING OWL AND GREEN-RACER SNAKE—SKUNK AND ITS ODOUR—RETURN TO VANCOUVER ISLAND—KEYHOLE LIMPET AND PARASITE (LEPIDONOTUS LORDI)—DENTALIA OR MONEY-SHELL.

THE CAMP of the Commission is pleasantly situated in a hollow, rather than a valley, between rounded hills, perfectly bare of timber, that form, as it were, a background to the little town at the Dalles. A small stream trickled near the tents, with only a few gnarled oaks growing on its banks.

Two animals are seen constantly, and appear in unusual abundance. One dwells amidst the rocks, that are piled in vast masses at the foot of the ravine, where we are camping, and is equally plentiful along the rocky banks of the Columbia river to the valley of the Des Chutes, beyond which, in the direction of Fort Colville, it is never

seen. This is easily accounted for. The Columbia ground-squirrel (*Spermophilus Douglassii*) lives principally on acorns; and the oak ceasing to flourish beyond the river, it becomes the boundary-line both to the oak and its dependant.

The Indians prize the *Wos-kee* both for its skin and carcase, devouring the latter, and sewing the former into robes. The *Wos-kee* gets as fat as a tame rabbit, and hybernates during winter. A shy active little animal, it is most difficult to obtain, dashing into the burrows betwixt and under the rocks on the slightest noise. They occasionally travel out on the grass-flats some distance from their retreats, and if frightened, elevate the long foxlike tail over the back, and in a series of most astounding bounds, make all speed for home. In the absence of their favourite acorns, they devour grass, roots, and the bark from any shrubs comeatable. The fur is dark-brown, with very long black hairs scattered through it. The ears are long, and a whitish circle round the eye gives the animal a comic expression, a kind of pantaloon face. Chin and throat a foxy-brown; sides yellowish, divided from the darker shade of the back by a wide stripe; tail bushy, and quite as long as the body, which is about eleven inches.

Living near the water, but occasionally wandering amongst the grass, are quantities of brilliant green snakes, the green-racer (*Bascanion vetustus*, Baird & Grd.). Not only does it bask on the grassy banks, or if frightened glide through the herbage, with arrowlike rapidity, but climbs trees with the ease and rapidity of a squirrel. In pursuit of tree-frogs, its favourite food, the snakes so nearly resemble green succulent branches, that I have often put my hand on them when birds'-nesting or seeking for insects. It always startled me, though I constantly took them in my hand, as I should a plant or a caterpillar, for examination. This snake's general residence is in the hole of a ground-squirrel, which is also chosen as a nesting-place by the western burrowing owl (*Athene cunicularia*).

I dug out several squirrel-holes whilst at this camp; in one I found two eggs of the burrowing owl, the female owl, a racer-snake, and an old lady-squirrel. The burrowing owl is strictly of diurnal habits, and feeds principally on crickets, grasshoppers, large beetles, and larvæ. I do not think it ever captures small animals or birds; a peaceful harmless bird, with little to boast of in appearance, voice, or wisdom. Why called *Athene* it would be hard to find out. Not by any means

plentiful, pairs of them are seen occasionally along the entire course of the boundary-line; but they are more plentiful southwards, through Oregon and California.

If on strolling up the stream, in the evening or early morning, your eyes should fail, the nose at once discovers that a skunk (*Mephitis mephitica*) has been taking a constitutional, and distributing a stench that, once inhaled, is not likely to be forgotten. Mix the very worst mud from the Thames on a summer-day, at low-water, with Rimmel's shop, a gasworks, fellmonger's yard, and knacker's boiling-furnace; and I will venture to assert that the odour produced, even if concentrated by the subtle power of chemistry, would be a mild and pleasant perfume, when matched against that of the skunk.

It is lucky for the trade of the perfumers, that their skill in essences, has not as yet attained to the power of concocting a perfume, equal in persistency to that secreted in the oil-glands of this most disagreeable animal; if such were the case, the sale of one small phial would supply an individual for a lifetime. A handkerchief odorised with scent so permanent, would defy the combined powers of soap, soda, and washerwomen to remove the mephitic bouquet, as long as the fabric retained its entirety.

Often in trapping, a poaching skunk has tried his thieving propensities on the dainty and tempting bait tied to a steel trap, cunningly laid in the run of a sable, and paid the penalty of his dishonesty by spending a night fast by the leg. The nose was quite enough to reveal what the captive was; the trap, the grass, the shrubs, the flowers, were all alike redolent of skunk. The smell met you, borne on the wings of the breeze, long ere the eye was capable of discerning the prisoner. Then to kill and extricate him from the trap was sure to entail a share of the stench, on gloves and clothes. Again and again I have buried gloves, trap, and trousers deep in the earth, and let them remain for weeks—a remedy of no avail:

> Bury and wash, or rub as you will,
> The scent of the skunk will cling to them still.

My constant companion was the Russian setter, that had as great a weakness for killing skunks, as he had for fishing out dead salmon. For days, nay weeks, after one of these encounters, I could hardly bear him near me; the sickening fœtor seemed to gain in strength as it exhaled from the dog, volatilised by the heat of his body.

We had a store near the Fraser River, a kind of depôt for provisions, from which the men were supplied who were employed in making the

boundary-line. In this store our storeman slept for some time, and, as bedsteads were superfluous luxuries, he camped on the floor. By some evil chance, a small colony of skunks obtained an entrance into the dormitory, and deemed a constitutional trot over the bed an enjoyable luxury. The skunk, jealous of interruption, if the sleeper (the victim of skunk incubus), hastily turned, then, as from a powerful syringe (as I have seen young ladies squirt scent from small metal bottles purchased at the Crystal Palace), the offended little night-walker fired its bottled nuisance over both the man and his bed. 'Once bit, twice shy,' says the adage. A light was carefully concealed behind a package; a double-barrelled gun, loaded with No. 5, capped and cocked, was placed within easy reach, and careful watch and ward kept. In happy ignorance, in marched the skunks for their nocturnal lounge, and, in the dead silence of the night, bang, bang! goes the gun, awaking everyone in the camp adjoining. I heard a Yankee packer, who slept near my tent, rouse up and exclaim, in nasal anger, 'Waal, thar's that varmint a fire-huntin' again. I'll be dog gone if I wouldn't sooner roost in a tree than camp down war them skunks is a makin' tracks all the night; I can smell em har!'

Intensely offensive though he be, nevertheless he is a handsome beast. The predominant colour is jet-black. A narrow snow-white line marks the centre of the forehead. Just behind the ears, from the nape, is a triangular patch of white, somewhat tinged with yellow. Confluent with this patch, two narrow lines of white run parallel to each other, for a few inches; then diverge rapidly, and extend along the back to near the tail, which is long and bushy, like that of the fox; but black, with a white tuft at the extreme tip. The length of the mature animal, from the nose to the root of the tail, is twenty-one inches.

The oil-glands are situated at the base of the tail. The animal possesses the power of ejecting the secretion with great force, and will hit an enemy at the distance of ten yards. The Indians and Voyageurs, after dissecting out the glands, devour the body with great gusto. The dissection and skinning are always done under water, in a running stream; by adopting this plan, the effluvia is washed away. I have tasted roasted skunk, but cannot say much in its praise. Its flavour is decidedly skunky, although the flesh is delicately white and tender.

The habits of the animal are strictly noc-

turnal, and a more predatory, thievish, treacherous, bloodthirsty poacher you could not 'skeer up.' His residence (which is always by the side of some still pool on the open prairie) consists of a large hole, dug in horizontally—a task rendered easy of performance when his powerful digging claws are brought into operation. Beaten roads extend from this hole to the water's edge; and the entrance to this den is usually strewed with ducks' feathers, the tips of the wings, the heads, beaks, and feet, together with bones deftly picked.

Ducks are his favourite birds; but, you ask, how can he possibly catch them? In this way. His instinct guides him to reside near the pools on which water-birds come to sleep and pass the night. When everything is still and hushed, and the unsuspecting birds are floating in fancied security, with their heads tucked under their wings, then out steals the crafty skunk, and creeping noiselessly down his roadways, swims, without the slightest splash, towards the drowsy birds, dives under the one that suits his taste, seizes it by the breast, and, spite of all its flapping, quacking, and struggling, drags the victim ashore, kills, and eats it. He seldom gets more than one in the night; for the other birds take timely warning, and leave for some safer retreat.

I have often wondered for what purpose this offensive secretion was given to the skunk. Any book on Natural History will tell you that it is a protection against all enemies. This I do not believe. Why given to the skunk and not to the pine-martin, ermine, or fisher, that live in the same localities, feed in the same robber-fashion, and have exactly the same foes ? It is for other than defensive purposes.

The skunks are principally confined to America, extending through both halves of the continent, though a few are found in Mexico and Texas. They appear to form a connecting link betwixt the badgers and weazels proper.

Now let us return to Vancouver Island, and take up the story where I left it, to go mule hunting.

From amongst the singular group of annelides, found along the coast of Vancouver Island, many of which are new species, and will be found described in the Appendix, I select the most curious :—

Lepidonotus Lordi (Nov. Spc., Baird.).—This species is about three inches long, and rather more than one-third of an inch in diameter at the broadest part of the body. It tapers gradually from the head to the tail, which is only two-sixteenths of

an inch broad. The colour is of a light brown, a broad line of a much darker brown running along the whole length of the centre of the back.

On the under-surface a groove runs down the centre of the body throughout its whole length. The elytra are thirty-five pairs in number, thin, membranous, and of a light-brown colour. The two first overlap each other slightly in the middle, but for the rest of its length, the centre of the back is uncovered. The antennæ are five in number—the central one short, of much the same length as the internal ones; the two external the longest, white, with a bright black ring round the upper part, but leaving the point white, which is acute at the apex. The feet are tolerably stout, and the two divisions are both furnished with sharp, but curved, pointed bristles. The superior cirri are white and of a moderate length, the inferior ones very short.

A good many specimens of this species were taken, and they were all found nestling under the shell, and occasionally coiling themselves under the foot, of the animal of *Fissurella cratitia*.

The Keyhole Limpet, I may briefly state for the benefit of the unlearned in shellfish, is a gasteropodous mollusc, belonging to the family

Fissurellidæ; its generic name, *Fissurella*, being derived from the diminutive of *fissura*, a slit. In shape and colour the shell closely resembles the ordinary limpet (*Patella vulgata*), so common on our British coasts; possessing a like power of adhering to the rocks, with a tenacity requiring knife and hammer to overcome; its shape is conical, the base being occupied by a powerful muscle, which is not confined entirely within the shell. It performs the office of legs by its expansion and contraction, a means by which the creature moves from place to place on the rocks; a system of progression you may see for yourselves, if you watch a garden-snail taking a constitutional over a cabbage. This muscle also enables it to fix itself at pleasure, aided by an atmospheric pressure of 15 lbs. to the square inch. They browse on seaweed, and are usually between tide-marks.

At the apex of the shell is a hole, somewhat oval: hence the name of keyhole. This orifice is for the escape of the outgoing branchial current. There are about 120 species, inhabiting all parts of the world—India, China, Australia, and the Pacific at Vancouver Island. When shell-collecting near Esquimalt Harbour, I frequently picked up empty fissurellas on the beach;

but diligent research at dead low-water, in the rock-pools, failed to discover the living fish; neither did the dredge ever bring one up, from deep or shallow water. The empty house, in this instance, was less desirable than a bad tenant, as the mansion without its liege lord was a useless ruin.

Macauley's Point, a long ridge of rocks running far out to sea, but bare at low-water, was a favourite hunting-ground of mine, the snug little rock-basins generally affording some novelty, left prisoner by the receding water. An unusually low tide disclosed a ridge of rocks I had never before seen, an opportunity for exploration not to be neglected. Clinging to the slippery wrack, and scrambling down a vertical ledge, I discovered a regular cave, its sides and floor literally covered with the strangest collection of marine wonders I had ever gazed on:—

It was a garden still beyond all price;
E'en yet it was a place of paradise.

* * * * * *

Here, too, were living flowers,
Which, like a bud compacted,
Their purple cups contracted,
Now, in open blossom spread,
Stretched, like green anthers, many a seeking head.
Others, like the broad banana growing,
Raised their long wrinkled leaves of purple hue,
Like streamers wide outflowing.—*Kehama.*

Actinia spread their treacherous petal-like arms, gorgeous in every variety of exquisite colouring; huge holuthuria, like brilliantly-painted cucumbers, clung to the dripping rock; starfish of all sizes and tints—chitons in black spiny mail—shells of purpura and trochus, and hosts of kindred. Annelides too were peeping from out their cases of stone and horn, their exquisite feathery tufts, fishing-lines, and traps wondrously beautiful, but, like the embrace of a siren, fatal in its clasp; all these creatures, hungry and anxious, awaited the coming tide. Biding his time like the rest in this stronghold was the Keyhole Limpet.

I had found him at last, and at home, so pounced upon him as a lawful and legitimate prize. Knife and hammer soon severed his close attachment to the rocks; and turning him up, to take a peep at his powerful ring of muscle and strangely-formed breathing apparatus, I spied a worm evidently very uneasy, about three inches long, brown, and in shape like an ancient dagger-blade. He appeared to me to be wriggling out from betwixt the folds of the foot or the mantle, and apparently most anxious to escape.

My first impression was, that he was a captive that by some mischance had got imprisoned

under the shell of the fissurella; and, thanking his lucky stars for such a fortunate deliverance, wished to make the best of his liberty, and rejoin his friends. But in displacing other shells, I found in nearly every one a similar tenant: the secret was discovered—the worm was a parasite, that lived in peace and good-fellowship with the Keyhole, recalling to my remembrance Oppian's lines on the pinna and the parasitic crab—

> One room contains them, and the partners dwell
> Beneath the convex of one sloping shell,
> Deep in the watery wastes the comrades rove,
> And mutual interest binds their mutual love.

That the parasite worm does no harm is clearly proved by the healthy state of the mollusc in whose shell it takes up its abode. How far mutual interest may conduce to mutual friendship, I am unable to say.

On more carefully examining the position of the worm, I found it was invariably coiled away in a semicircle under the foot, like a ribbon on its edge, never flat. This seems to me a wise provision; for the pressure of the muscles when the limpet grips the rock would crush a soft-bodied worm to death, if flat; but by being edge on, which is the position chosen, all risk of harm is avoided, as it fits in a cleft between two layers of soft material.

Tying several of them tightly round to prevent the worm escaping, I brought them home *in situ.* At least four out of every six contained a parasite, and, what is rather strange, the worms were nearly all of one size. A query or two naturally suggest themselves. How did this friend or intruder, whichever it may be, first get installed as a lodger? Did he get in as a baby, and thus become an adopted child; or did he slip in as a full-grown annelide, defying the Keyhole Limpet to turn him out? How does he procure food; and on what does he subsist? I confess utter inability to give a satisfactory reply: my impression, however, is, that the parasite grows from a minute germ (if that is a right term) in the place and position in which I found it.

I put them in sea-water, after taking them out of their sanctuary, but in no single instance did one ever go back again. I tried to replace them, but could never accomplish it, or induce the worm to remain. Not that this proves anything, inasmuch as experience teaches that interference with the regular habits of any of the lower forms of life is at once resented; and the power, or will it may be, to adapt itself to altered circumstances is but slowly acquired. I cannot conceive the possibility of a large worm, the feet armed with

curved bristles, like bundles of minute fishhooks, being quietly permitted to creep under the shell, and force its way by crawling round and round the foot, by a system of hook-and-drag. In no other way, however, could it edge in, without worrying and enraging the fissurella beyond all power of endurance—ordinary pressure being only needed to squeeze the intruder flat as a pancake. By gently tickling it with a bit of seaweed under the shell, one would say that patience was a virtue but little cultivated by the fissurella; the slightest touch, and down goes the shell with a force that cuts the weed in two like scissors. What chance would a soft-bodied worm stand? Not the slightest. The parasite, like Topsy, was 'raised' where it lives.

What part a worm, doomed, as far as we know, to pass its whole life captive in the shell of a mollusc, plays on Nature's wide stage, is a problem beyond human ken. We know nothing was created in vain—that even the tiny diatom has its use; and this insignificant annelide serves a purpose and fulfils a destiny, in the endless maze of life, as important as the lordly lion, or even man himself.

It may not be generally known that the Dentalium, or Money-shell, is used as an article of currency by the native tribes of North-west America.

A genus of univalve shells, principally worthy of remark for brilliancy of colouring, and susceptibility of taking a high polish, and usually designated *cowries*, has long been used as a medium of currency. The animal living in the shell is a gasteropodous mollusc, and the money-shell belongs to a species well known in commerce as the Cyprea moneta, or money cowrie. This shell is the money, the current coin in use by the natives of Bengal, Siam, and various parts of Africa. The grand supply comes from the African coast, where the shells are collected by the negresses and exported to various parts of the world. Just as the cowrie is used in other parts of the world as money, so the dentalium, in North-west America, is applied to a similar purpose.

The form of the shell, as its name at once suggests, is tooth-shaped; but the tooth, the resemblance to which has given rise to the name, is the long holding or canine tooth of a carnivorous mammal: the holding-fang of the dog may be cited as a familiar illustration. The tenant of the shell belongs to the family Dentaliadæ.

The shell has an orifice at both ends, and the animal inhabiting it is attached to its calcareous

house near the smaller opening. Eyes it has none, nor any long tentacles or fishing-arms. The blood is red, sexes united, and the breathing organs a symmetrical pair.

The food of these molluscs appears to be strictly of an animal character. Living, as I shall further on explain, in the sand, they wage war on and continually devour small bivalves, foraminifera, or any small marine zoophyte that an unlucky destiny may chance to wash within reach of these submarine cannibals.

The habit of the animal is to burrow in the sand, the small end of the shell being invariably downwards, to live in water from four to eight fathoms in depth, and always to choose a sheltered harbour or arm of the sea as its haunt. The large end of the shell placed close to the surface of the sand, allows the animal free scope to seize upon any unsuspicious wanderer that prowls near it.

The dentalium I now more particularly allude to has been recently described by Dr. Baird, in a paper read before the Zoological Society, with notes on its habits and monetary value, appended by myself:—

'Amongst the objects of Natural History and Ethnology brought from Vancouver Island and British Columbia by Mr. Lord, is a belt composed

of numerous specimens of a species of Dentalium strung together. The species bears an exceedingly close resemblance to that described by Linnæus as *Dentalium entalis* (*Entalis vulgaris* of Risso, and of Dr. Gray's "Guide to Mollusca"), and appears to me, notwithstanding the difference of habitat, to be undistinguishable from that European species. It has, however, been described by the late Mr. Nuttall as Dentalium pretiosum; and a figure has been given of it by Mr. Sowerby, in one of his late numbers of the "Thesaurus Conchyliorum."

'From a careful comparison of the typical specimens of *D. pretiosum*, in Mr. Cuming's collection, there can be no doubt of the identity of that species with the specimens brought by Mr. Lord from Vancouver Island; those in Mr. Cuming's collection are said to be from California.

'In examining the old river gravels on the banks of the Columbia River, alluded to in vol. ii. along with numerous other articles, such as human bones, flint instruments, &c., Mr. Lord found a number of specimens of a species of *Dentalium* considerably eroded and worn, which I have compared with some in Mr. Cuming's collection, and find identical with the Dentalium striolatum of Stimpson, from Newfoundland. I strongly

suspect that both these species, D. striolatum and D. pretiosum, are only very slight varieties of the old Linnæan species, Dentalium entalis (Entalis vulgaris).

'The habitats of the three species are very different; but notwithstanding this, in the absence of distinct specific characters, I should hesitate very much making distinct species of them. However that may be, the history of the specimens brought by Mr. Lord is very interesting; and these few observations must be considered only as introductory to the very instructive notes drawn up by that gentleman, a perusal of which will prove the best apology for these brief preliminary remarks.'

The money-shells are procured upon the north end of Vancouver Island; also in the bays and inlets along the mainland coast north of latitude of 49° to Sitka; and is common likewise round Queen Charlotte's Island. The genus has an enormous geographical range; and it is, perhaps, strange that the shells from North-west America, from California, and those obtained on our own coast, when placed side by side, scarcely present any material specific differences.

When a chief dies, of course, according to the redskin creed, he will require in the next world—

the happy hunting-grounds to which he has gone —all the luxuries and necessaries his good fortune enabled him to enjoy in this: so it generally happens that two or three slaves (male and female), two or three horses, and two or three dogs are shot, and laid on or in the earth where rests the remains of the departed! But I have always observed that very old slaves, and very ancient canine and equine quadrupeds, are deemed by the sorrowing relatives quite good enough to send on such a hazardous journey —a wise economy, worthy of a better cause. These slaves are bought and sold after the fashion of dogs and horses, and shells of the dentalium are the sovereigns and shillings used to pay for them.

Indians are, without an exception, most inveterate gamblers. I do not know a single tribe —and I have seen something of almost every tribe east and west of the Rocky Mountains— that have not some curious games of chance. Along the coast the stakes are usually strings of shells, and the game played is called met-ala. It is played with the four incisor-teeth of the beaver, engraved much after the fashion of our dice; but, instead of being thrown from a box, they are sent broadcast from the hand, on a deer

or bearskin spread on the ground. Slaves, dogs, horses, and even a man's wives, are frequently lost at this game. There is a beautiful set of these gambling-teeth in the Ethnographical Room of the British Museum, as well as strings of the dentalium, as strung for money, so that any person who may be curious on the subject can easily see them.

The intrinsic value of the shell, as an article of barter, entirely depends upon its length; and the question as to whether the shell when procured shall, figuratively speaking, represent a sovereign or a shilling, is calculated by the Indians in this way:—If twenty-five shells placed end to end measure a fathom or six feet in length, these twenty-five shells, when strung together side by side, are called a *hi-qua*. The squaws string them very neatly. A small bit of dried sinew, taken from the suspensory ligament of the reindeer (here called the caribou), is passed through the shell, there being, as I have already said, a hole at each end. These transverse pieces of ligament are made securely fast to two lateral or side-cords, which side-cords are fastened together at each end; so that the string of shells, when complete, is like a ribbon made of holding-teeth. The string is generally ornamented most ela-

borately with fragments of nacre from the haliotis shell, and tufts of dry wool taken from the mountain-goat (Capra americana).

The short, broken, and inferior shells are strung together in the same manner, but in various lengths, and represent shillings or pence, as the string is either long or short, or the shells defective. All inferior strings, irrespective of either length or quality, are called kop-kops. The *hi-qua* represents the sovereign, the highest standard of currency, and, as a rule, would purchase one male or two female slaves. The value of the slave, estimating it by the sum paid in blankets for a slave at the present day, would be about 50*l.* sterling. Forty kop-kops equal a *hi-qua* in value, but various small bargains are made, and small debts paid, with kop-kops, only just as we pay away shillings, or lesser coin.

Since the Hudson's Bay Company have established trading-stations along the coast, at the north end of Vancouver Island, and on the main rivers inland, both east and west of the Rocky Mountains, blankets and beaver-skins have become money, so to speak, and the medium of exchange. If you bargain with an Indian in the interior to do any service, you agree to give him so many skins, either per diem, or as a fixed price for the work that is

to be done; but in making this agreement, it is not understood that the employer must really pay so many beaver-skins. What is meant is this—that the Indian gets an order from you on the trading-post of the Hudson's Bay Company, for goods equal to the value of the beaver-skins you contract to pay him.

Every article given in exchange by the Hudson's Bay Company is calculated according to the value of beaver-skin, and as beaver may be either plentiful or scarce (or, in other words, dear or cheap), so are goods bartered for fur calculated as to value. Bears, foxes, otters, martens, fishers, and lynxes are respectively worth so many beaver-skins each, or, beaver being dear, it will require two marten-skins to equal a beaver. Then, as a blanket is worth so many beaver-skins, or as a beaver will pay for so many charges of powder or strings of beads, the beaver becomes the standard of value. If you buy a horse, a dog, a wife, or a salmon, you contract to pay so many skins. On the seacoast, where the savage and the paleface have seen much more of each other, the rate of service is now generally asked for in blankets, shirts, or the 'almighty dollar.'

But in early days, ere the red and white men

knew each other, the dentalium was the only currency in use. It is quite clear, and also a very curious fact, that the hi-qua and kop-kop were known and used by the Indians of the interior at some distant period, although no trace of their use, or knowledge of the shell, exists among them at present; for in digging out some flint implements, stone beads, and other things I need not here enumerate, from the drift, I found numbers of dentaliums and round buttons made of the Haliotis nacre. The distance from the nearest seaboard was about a thousand miles, and the language spoken by these inland Indians quite incomprehensible to the Indians on the coast. But as I have more to say about the various tribes occupying North-west America, I shall here only explain the system adopted by the Indians to capture the money-shells.

An Indian when shell-fishing arms himself with a long spear, the haft of which is light deal; to the end of it is fastened a strip of wood placed transversely, but driven full of teeth made of bone; the whole affair resembles a long comb affixed to the end of a stick with the teeth very wide apart. A squaw sits in the stern of the canoe, and paddles it slowly along, whilst the Indian with the spear stands in the bow. He

stabs this comblike affair into the sand at the bottom of the water, and after giving two or three prods draws it up to look at it: if he has been successful, perhaps four or five money-shells have been impaled on the teeth of the spear. It is a very ingenious mode of procuring them, for it would be quite impracticable either to dredge or net them out; and they are never, as far as I know, found between tide-marks.

CHAPTER II.

PIGMY OR MEDICINE OWL AND NEST—SUPERSTITIOUS DREAD OF INDIANS—GOLDEN-CREST AND ITS CRADLE—RUFFED GROUSE.

THE PIGMY OWL.

Glaucidium Gnoma, Wagler; *Strix passerinoides*, Tem.; *Strix infuscata*, Tem.; *Glaucidium Californicum*, Sclater; the Medicine or Death Owl of the North-west American Indians.

This rare and beautiful little owl, the smallest of all the North American species, I shot for the first time on Vancouver Island. It has also been obtained, though rarely, in Oregon, Washington Territory, and California.

The habits of this tiny bird appear little known. Its diminutive size, shy solitary habits—for it always hides amongst the thick foliage of the oak or pine, except when feeding—renders the task of observing it, or obtaining a specimen, at all times difficult; hence a few dried skins, from which its generic and specific characters have been determined, are the only specimens we possess. How

the recluse lives, where it lives, or what it does, are secrets.

Early in the spring, whilst collecting the migrant, birds which arrive at Vancouver Island in great numbers and variety of species—some to remain the summer through, others only to rest awhile as they journey farther north to their breeding-grounds—Dame Fortune, fickle though she generally be, deigned for once to smile, and afforded me an opportunity to watch the habits of the Pigmy Owl. Two of these strangers selected as their home a gnarled and twisted oak (*Quercus garryana*), that grew alone on an open patch of gravelly ground near a small lake. Close by this lake were the remains of an Indian lodge, that had been once used as a fishing-station, affording me a capital place of concealment wherein to watch the manners and customs of these—to the aborigines—potent and much dreaded spirits.

My camp was not far away, thus enabling me to reach my hiding-place at the first blush of morning. No sooner did the rosy light creep down the valley and spread over the plain, than the owls were up and stirring—evidently hungry from a night's fasting; for, like a well-conducted couple, they retired early to rest.

Their flight—short, quick, and jerking, similar to that of the sparrowhawk—is quite unlike the muffled noiseless flap of the night-owl, as it sails along over marsh and meadow in pursuit of mice, lizards, or any benighted rodent that has incautiously strayed from its place of safety. The food of this little owl is entirely insectivorous, its favourite morsel a fat grasshopper or field-cricket: not that it by any means refuses or objects to breakfast on an early riser, be it beetle or butterfly, that, like the proverbial worm, is so devoid of prudence as to permit the 'early bird' to gather it.

When in pursuit of food, the owls perch on a small branch near the ground, sit bolt upright in an indolent drowsy manner, until their quick eye detects an insect moving on the plain; then they pounce suddenly upon it, hold it down with their small but powerful claws, and with their sharp beaks tear the captive to pieces. The hard wing-covers and thighs, if a cricket, or the wing-shields if a beetle, are rejected, only the soft abdominal parts being eaten. Hunger satiated, they return to their tree, and, cuddling lovingly together, sit and doze away their time, protected from the blazing rays of the midday sun by the foliage of the sturdy oak.

Their breakfast disposed of, I used to abandon my post, and, like the owls, eat and sleep under some shady covert.

As near as possible to the mergence of twilight into night—what the Scotch call the 'gloaming,' and in our country is known as 'cock-light'—when the woodcock skims through the grove and the blackbird chink-chinks his vesper hymn—exactly at this time the owls invariably came out; and, as if for the purpose of stretching their wings rather than feeding, took erratic flights round the tree, and up and down the plain, chasing one another, and performing all kinds of inexplicable manœuvres. Occasionally they settled on the ground, but never remained long. I do not think they ever capture an insect whilst it is on the wing, and a very small quantity of food appears to satisfy their wants. As it became dark, having supplied their evening necessities, they again returned to their dormitory, and, as I imagine, slept away the night.

In their habits they appear to have nothing in common with the typical owls (*Striginæ*), and approximate, though slightly, to the day-owls (*Nycteininæ*). Cassin, in his 'Birds of California,' calls this owl Glaucidium infuscatum, regarding it as the Strix infuscata of Temminck. Dr. Sclater, however, proposes to call it Glaucidium

Californicum.* There can be no doubt that the two names, Strix infuscata and Strix passerinoides, were used by Temminck to designate the same species, which is strictly from South America, and quite distinct from our little friend, though closely allied. The name Glaucidium gnoma, used by Wagler, I adopt as having precedence.

Its specific characters need not be given here, being readily obtainable by referring to any of the list of works quoted in the synonyms. I may mention, however, that the grand and marked specific differences, as distinguishing this from the South American species, are that in G. gnoma the toes are naked, the colour generally lighter, and the size somewhat less. Total length of male, 7 inches; wings, 3½ inches; tail, 3 inches. The sexes are very nearly alike, but the female is rather the larger, and more thickly spotted with white.

Early in May two small eggs were laid—round, and very rough on the surface—a large knot-hole in the branch of the oak being selected as the nesting-place. Not a particle of anything was used as lining, the eggs being deposited on the bare wood. The length of time occupied in incubation I regret inability to state, having to shift my camp some distance away soon after the

* 'Proceedings Zoological Society,' 1857, page 4.

female commenced sitting. When next I visited the tree, both young and old were gone, much to my disgust and annoyance. By the scattered feathers, that lay ominously beneath the tree, I imagine a prowling martin or fisher had played havoc with my pet family, and devoured, perhaps, both parents and children.

The Indians, without exception, hold this little owl in terrible dread. To see one in the day, or to hear its feeble cry, not unlike a stifled scream, is a fatal omen to brave or squaw; the hearer or near relative is sure to die ere the end of the moon. To kill one is an unpardonable heresy. I nearly got into very serious trouble for shooting a specimen of this little owl. An Indian deputation, headed by their chief, waited on me, and protested against my risking theirs and my own inevitable destruction. All reasoning was futile, and there was nothing for it but to procure all the mystic birds and mammals by stealth.

It is a curious fact that owls, in every part of the world, have always been deemed birds of ill-omen. The crumbling ruins of an ancient monastery, the old tower in the ivy-clad castle, and the ghost's chamber in a haunted house, are invariably associated with owls and goblins.

Pliny, in his 'Natural History,' when speaking

of birds of evil, says: 'The owl is a dismal bird, and very much dreaded in public auguries; inhabits deserts that are not only desolate, but dreary and inaccessible; it is a monster of night, nor does it possess any voice but a groan.'

Virgil alludes to it as foreboding the death of Dido:

> Solaque culminibus ferali carmine bubo
> Sæpe queri, et longas in fletum ducere voces.

Shakspeare, too, saddles this poor bird with the guilt of ominous predictions.

Casca, in alluding to the events preceding Cæsar's death, says:

> And yesterday the bird of night did sit,
> Even at noonday, upon the marketplace,
> Hooting and shrieking.

In Egypt, in bygone years, if the Pacha presented a gentleman with a drawing or any representation of an owl, it was meant as a polite hint, to the recipient of the gift, if he did not dispose of his own life, the powers supreme would save him the trouble. More modern poets rarely scandalise or malign the owl's character. As knowledge of the physical sciences has become diffused, so the mists of superstition have vanished, and modern writers, even in poetic composition, truthfully allude to its habits.

Coleridge, in 'Christabel:'

> 'Tis the middle of the night by the castle clock,
> And the owls have awakened the crowing cock.

Again, Longfellow, in 'Hyperion,' speaks of the owl 'as a monk that chants midnight mass in the great temple of Nature.'

With every Indian tribe I have ever met with, either east or west of the Rocky Mountains, the owls, whether large or small, are always held sacred—their feathers being worn as charms by the medicine-men or conjurors of the tribes. It is perhaps fortunate for the owls they are so dreaded. There are many Indian traditions I could relate, where terrible calamities have invariably followed the warnings of the Pigmy Owl, but space forbids.

Why such an exquisite type of Creative Wisdom—beautiful in plumage, retiring in habit, harmless, and gentle—should inspire terror and aversion, are mysteries I must leave to wiser heads than mine to solve.

Hardly has the snow left the hillsides and sunny slopes, and whilst deep patches still linger in the valleys and shaded spots; when early spring-flowers peep out, here and there, from some sheltered spot, and the bursting buds but faintly reveal the leafy treasures hidden within their

horny casings — the sloppy transition state, when summer has not come, and winter has not gone—then it is our eyes, and hearts too, are gladdened by the appearance of flights of birds; some passing on, others remaining to build, rear their fledglings, and enjoy the northern sunshine. One of the earliest migrants is the Golden Crest (*Regulus satrapa.*) They are the most sociable of birds, and evidently are fond of good society, and plenty of it, until their domestic duties demand a certain period of seclusion. Then the tiny faithful couples leave their restless friends, as their friends also leave each other; by-and-by to join together again, reinforced with hosts of Misses and Masters Wren, to indulge in arboreal revels, until the rough autumnal winds bids them depart for the more genial and sunnier south.

The Golden Crests are always, except during the nesting-time, in company with the Tits and Nuthatches. Flocks, consisting of fifty or sixty, may be seen, completely making the round of a prairie, travelling along from bush to bush; sometimes ascending into the pine-trees, at others clinging to the slender stalks of grass and wild flowers, even their diminutive forms bending the fragile support to the ground—

ever singing, chattering, quarrelling, but never resting. It is a pleasant sight to watch this army of insect-hunters, climbing back downwards, peering curiously into every crack and crevice under the leaves, and into the flowers. Concealment is of little avail to the insect; sharp eyes spy him out, and sharper beaks nip the idler, and drag him from his lair. Often a moth, or other winged insect, takes refuge in flight, when surprised in his nest; then a host of nimble pinions dart after the fugitive, and, spite of twists and turns and angular efforts to escape, tit or golden-crest catches him, and, descending to the ground, himself pursued by his fellow-hunters, picks off the gay wings and legs of his prize, then swallows the dainty but limbless morsel.

There are few more skilful architects than the Golden Crest. The place selected for the nest is generally at the end of a pine branch, where, like a cradle, it is rocked by every passing breeze; but so ingeniously is the nest contrived, that, rock and swing as it may, neither eggs nor young can ever be jerked out. The nest is tightly woven, and composed of twigs, moss, lichen, fronds of the larch, and dead leaves; a structure, when completed, exactly resembling the branch of the tree to which it is really

lashed, with ropes of vegetable fibe. The fronds of the fir form admirable sunshades, or umbrellas, as circumstances may require. The inside is lined with feathers, soft hair, and spiders' web—the web seems used for the purpose of warping the other materials tightly together; a partial dome covers the top, under which is the entrance-hole. The circumference of the nest is about nine inches. Six is about the usual number of eggs laid.

In the valley of the Columbia the golden-crests begin building in June, and on Vancouver Island somewhat earlier. Tits and nuthatches generally nest in holes, in the same tree the wren selects for her pendant nursery.

The general colouring of this handsome little bird is yellowish-olive inclining to green, the head being crowned with a tuft of bright golden-orange feathers. Their song, soft and mellow, is trilled out nervously, like the tremulous notes of young Lady shaky, on her first vocal performance.

A very frequent companion of the Tits is the Ruby-crowned Wren (*Regulus calendula*), somewhat larger than the Golden Crest, of a brighter green on the back and neck, and more yellow under the wings. The crown, instead of being orange, is bright scarlet. I met with it on both slopes of the Cascades. It resembles the golden-

crest in all its habits, and builds a very similar nest. The young have no crest until the second year after leaving the nest. These birds are rarely seen in the summer during the breeding-time, as their haunts are seldom accessible to man.

I have already spoken of the Sumass and Chilukweyuk prairies. Whilst camping there I had abundant opportunity to watch the habits of many curious residents in these prairies and their adjacent forests of pine:—

THE RUFFED GROUSE—OREGON GROUSE—PARTRIDGE, PHEASANT.

Bonasa Sabinii, Baird; *Tetrao umbellus*, Richardson, F.B.A.

This grouse has an immense geographical range: west of the Rocky Mountains, from the borders of California, throughout Oregon and Washington Territories, extending high up on the slopes of the Rocky Mountains; plentiful in all the timbered land between the Cascades and Rocky ruts along the banks of the Columbia, over the ridge of the Cascades, down their western slopes to the Fraser, on all the islands of the Gulf of Georgia, and everywhere on Vancouver Island to its extreme north end, and on the mainland north to latitude 53°. East of the Rocky Moun-

tains, its very near relative, *Bonasa umbellus* (Steph.), again ranges through Canada—indeed, I may fairly say, over the greater part of America. But what follows applies to Baird's new species, found only west of the Rocky Mountains.

The habits of this grouse are singularly erratic, and his food is of the most varied character. In the spring-time his favourite haunt is by the side of some stagnant pool, or in the brush round a marsh where the crab-apple (*Pyrus rivularis*) and the black-birch and alder grow, where fallen timber lies crumbling and rotting away; where everything mouldy, dark, damp, and oozy seems to hold high festival; where flabby fungoid growths spring like huge ears from moist-decaying wood, and gigantic agarics sprout up in a night like mammoth fairy tables; here, too, the skunk cabbage, with its great green succulent leaves, grows in rank luxuriance, covering up the surface of the mud like a huge mat.

In such spots as these, in the month of April, the wooing begins. They regularly pair, and having once exchanged the nuptial promise, are, I think, most constant to each other during the nest-building and hatching time. During the time of pairing, and at intervals after the

chickens are hatched, the male produces that extraordinary sound called 'drumming.' Again and again have I sat and watched the proceeding. There is a solemn quiet—an almost deathlike silence—pervading these mighty wilds of the far North-West, unlike anything we can conceive where the hand of civilisation has been busy. The bird squats on a log or fallen tree, motionless, as though it had no life; suddenly, all the feathers are, as it were, reversed; tail erect, like a strutting turkey-cock; the ruff round its neck stands out, stiff and rigid, and the wings droop on either side of the log as if broken. They slowly vibrate, and then produce a sound, loud and clear, like the thrum of a double-bass string; faster and faster it comes, as the wings move with greater rapidity, until the beats have no distinctness, and the sound has become a throbbing hum. He suddenly ceases, and after a few minutes' rest goes through the same performance.

Perhaps the stillness I have referred to induces one to imagine the sound to be louder than it really is; but if one did not see the bird, and did not know whence the sound came, a fertile brain could easily imagine it some demon drummer in active employment. For what purpose this sound is produced I am by no means clear:

whether it is to intimidate the cocks and keep them off, or whether it is to proclaim his near proximity to the hen, or whether it is a sexual performance to demonstrate his love and devotion, are matters that the bird alone can answer. If he knew how constantly the sound betrayed him to the crafty savage, I rather think he would adopt a more silent system. Guided by the drumming, the redskin creeps like a weasel through grass and bush upon the unsuspecting bird, and, sending an arrow whistling through its ribs, or half a dozen buck-shot from an old trade-gun, thus stops his fun, and 'turns his thoughts from mirth to gravity.'

I have often seen cocks fight furiously during the pairing season, and their manner of adjusting their little differences is much after the fashion of our gamecocks. That old maxim, 'None but the brave deserve the fair,' is evidently a great grouse principle. Ruffing up their necks, head and back almost in a straight line, tail up, legs stiff, and wings dropped, they circle round and round each other, striking and pecking until the vanquished hides anything but his diminished head, and the victor bolts upon a log and drums furiously.

The nest is complete about the end of May. It

is always placed on the ground under a fallen log, or at the foot of a bush; and is composed of a quantity of dead leaves, lined with dry grass, bits of moss, and a few feathers. From ten to fourteen eggs are about the average number I have found; in colour, dirty white, without any spots, or freckles of darker brown. I think I must have found at least ten nests in one swamp, near the Spokan prairies, *en route* to the Rocky Mountains.

The moment they are clear of the egg, the chickens leave the nest and follow the mother. She calls them with a kind of clucking sound just like a hen, and covers them when resting. Like most of her tribe, the mother uses all kinds of feints and stratagems to lure an intruder from her young. I have seen an old hen ruffed grouse flutter along close to my feet, as if her legs and wings were entirely disabled, allowing me to almost put my hand upon her; having thus decoyed me on and on, until her chickens had time to conceal themselves, she would dart suddenly off, I daresay thinking how cleverly she had 'fooled me.' It is a curious thing that this grouse when frightened rises with a loud rattling noise, but when it rises of its own free will, it is as noiseless as the flight of an owl. I have often, when lying down watching them, seen the

birds rise and fly upon a tree without a sound; but only walk up to them, and a sharp whirring noise is invariably produced when they flush. As soon as the chickens can follow, the dark swamp-brush is abandoned, and the favourite locality is an open hillside; especially if a mountain-burn comes brawling down among the rocks, resting here and there in coy little pools—drinking-fountains of Nature's own contriving. Here too grass-seeds, berries, and insects are in abundance, and the woolly little chickens feed right royally.

They never, like the sharp-tailed grouse, pack, but almost invariably keep together in broods; they love to frequent trails or sandbanks, where they can dust themselves. They are bitter enemies to ants: having a weakness for the eggs, they scrape and scatter to the winds their little wood-piles, the toil and labour of hundreds of busy architects, sending the building material flying far and wide, until the egg-treasury is reached, and ruthlessly despoiled.

From September to Christmas the 'white-flesher' (for so he is named) is at his best, having had the full benefit and advantage of the berry and nut season; his flesh is pure white, and he is most delicious before he begins to devour the leaves of the fir; this he does as soon as the

snow shuts him off from any other kind of living, and he then acquires a flavour of turpentine, which is anything but agreeable. Nice as he most unquestionably is for the pot, he is not a bird a sportsman would love. His system is to perch on the nearest branch; and so accurately does the plumage resemble the lichen-covered bark of the trees, that it is difficult and often next to impossible to descry him. His habit when perched, if at all alarmed, is to crouch down the long way of the branch, the head and neck extended to the utmost, and the throat pressed tightly down; when in this position, although the bird has been close to me, I have been unable to see him; and when you have fairly made him out, it is very difficult to shoot him. 'Shades of my grandfather!' I hear some gunner say, 'what, shoot a grouse on a tree!' Again I say, Yes. I wanted him for the pot, or his skin, or maybe for both. But, let me tell you, he can fly if he likes, and I know no grouse more strong or swift on the wing than the ruffed grouse, when it suits his humour to go. I have had several spurts of good shooting with this same white-flesher on the Sumass and Chilukweyuk prairies, and at other places west of the Cascade Mountains, on the banks of the Fraser river.

It was in October, and the snow was just beginning to mantle the hilltops in the livery of the Frost-king, warning bird and beast that it was time to retire into valley-quarters for winter. The grouse had come down from the hills, and were lying in the long prairie-grass, about a rifle-shot from the edge of the bush. They rose before my dog singly, and went off to the covert like a ball. I had No. 5 shot, and I soon found I could not venture to let them go very far. I made, however, a very fair bag, finishing off with some mallard and bald-pates, as I recrossed the prairie to my camping-ground.

A great qualification in an Indian or trapper's dog is 'to tree a grouse;' the dog flushes them, and the grouse perch at once upon the branches just above the dog's head, and peer down stupidly at him, craning their long necks to get a peep at the intruder—thinking, doubtlessly, what a rare and curious animal it is. The dog, looking up as the fox did at the crow in the fable, barks and yaps with all his might; this induces the gunner to come and see what it all means, and he too spies the grouse. If care is used to shoot the under birds, often three or four may be killed before the others are sufficiently awake to their danger to fly off.

CHAPTER III.

THE STORE-KEEPER—APLODONTIA LEPORINA—AMERICAN DIPPER.

THE STORE-KEEPER.

(*Tamias guadrivittatus.*)

ONE of the liveliest, prettiest, merriest, and, to judge from appearances, the happiest little animal one meets with in North-western wilds, is a tiny squirrel, known and feared by the Indians, who have a name for it, unpronounceable by any mouth of ordinary conformation; and to attempt writing it is only to give a long list of double and single letters, the type-pattern for spelling Indian words. For example,—*ch-a-ta la-ch*,—what can you make of that? Corkscrew the word out, giving it all the throat-sound and tongue-twisting you can manage, and it has as little resemblance to the name, as rolled out from the larynx of a redskin, as the wheeze of a bagpipe has to the clear, rich, mellow note of the mocking-bird.

To the scientific world my furry friend is

known as *Tamias* (nearly as bad as Indian); *tamias* being Greek for 'store-keeper,' the generic title. The specific name tells us that he has four stripes, or '*ribbons*,' marking his skin. The Missouri Striped Squirrel is the familiar appellation of the white settler; the Ogress Squirrel of the savage—why so named will be shown in the sequel.

The specific characters are, briefly:—Tail quite as long as the body; a grey stripe along the top of the head, joining two others passing below the eyes; a hoary patch behind the ears; general colour, deep ferruginous red; back marked with four equidistant stripes, nearly black, extending from the neck to the tail; length four inches, without the tail. Incisors (cutting-teeth) strong, and deep orange-colour on the outer surface; on each side of the mouth is a large pouch, opening just anterior to the molar teeth, and extending back to the shoulder.

In these capacious sacks, seeds, bits of favourite roots, indeed anything either eatable or storeable, is carried to the 'store-keeper's' residence. The pouches are filled from the mouth; the forefeet being used, much the same as hands, to press the cargo back, and tightly pack it. When emptying them, the forefeet are again called into requisition; placed behind the corpulent bags, the

contents are pressed out by a kneading kind of movement.

Where a more striking evidence of Divine wisdom and forethought! But for these leather bags, it would be utterly impossible for this little animal to carry in a store of provisions sufficient for his winter supply. He does not sleep, like the 'Rock Whistler,' and live on his own fat, but only *partially* hybernates; and hence needs a stock of food, with which he provides himself during the sunny summer days.

His mansion is usually under a fallen tree, or amidst the tangled roots of the giant pines. A small burrow neatly dug, and round as an augur-hole, leads in a slanting direction to an open cavity, neatly lined with dry leaves, blades of grass, and moss—a bed soft as eider-down, wherein the 'store-keeper' sleeps. In an adjoining opening, on a kind of earthen shelf, is his store, neatly piled away, to be carefully hoarded, until the biting blasts of winter, sweeping through the forests, stripping land and tree alike of their verdure, warn the provident workman to retire into his snug quarters, not to shiver, cold and hungry, until the spring-time comes, and bids the flowers ope their blossoms, and the buds burst into leaf. Not a bit of it: his industry has provided not only a snug residence, but food in abundance, to supply his

daily necessities—a garrison in which he can defy wind, rain, frost, and snow, and bide his time until the Ice-king yields his sceptre to the genial ruler of the summer.

This squirrel seems to live everywhere. Wander round the margin of the emerald-green prairie, and there, amidst the hazel, mohonia, vine-maple, and various shrubs that love the sunshine, the 'Store-keeper' is sure to be seen, skipping along on a dead stick, or scudding through the bushes; stopping continually to have a peep at the intruder; sitting bolt upright, with its tail erected, defiantly chattering angrily, in a kind of half-laugh, half-bark; then uttering a shrill chirp, a danger-signal to others, then makes for its hole and disappears. Paddle in a canoe down the surging stream, past the piles of driftwood, heaped mountains of dead trees; and as the frail bark shoots by, you are certain to see the 'Store-keeper' scampering from log to log, his scolding and whistling lost in the noisy rush of the torrent. Dive into the dark shadow of the pine-forest, where mouldy life holds high festival—where huge fungoid growths and giant agarics spring in flabby clusters from the oozy logs—where the pools, thick and slimy, are covered with the green fleshy leaves of the

'skunk cabbage,' and each branch and spray, draped with the black lichen (*Lichen jubatus*), seem mourning over death and decay on every side—in these damp solitudes lives the 'Store-keeper,' merry and quarrelsome, as in brighter scenes. Climb the mountain-side, and scramble through the rock-walled ravine, where the pine clings to the stones rather than grows from their clefts; where no murmuring streamlet cools and refreshes thirsty Nature, or breaks the solemn silence with its rippling music; and not even the footfall of the savage disturb its echoes; and naught living, save the denizens of the air, that peep into its weird depths from the tree-tops, ever visits it: yet in the very loneliest of these glens the 'Store-keeper' is sure to be met with. Climb on—higher, higher—to the perpetual snow-line, marking the boundary betwixt life and icy desolation; and there too, on the very frontier, he bounds, and jumps from rock to rock, ever scolding, laughing, whistling, and toiling, to garner in his harvest.

Two of them, husband and wife, took up their abode in an old sawpit, close to our winter-quarters, at Fort Colville; and there constructed a nest, during the month of July, for the mamma to bring forth and rear her offspring in. I

carefully watched them from day to day, and, with the exception of an occasional scolding, they took little heed of my presence. A hollow place was first cleared under one of the cross-timbers of an old sawpit; then both worked hard, bringing blades of dried grass, leaves, and moss. I observed they carefully collected fragments of rag, and pieces of paper left by the sawyers; so, to gratify this taste for the use of novel material, I brought out continually small bundles, composed of coloured threads, rags, paper, fragments of scarlet cloth, and small portions of gold and silver lace from my fishing-tackle stock. All these were greedily seized on, and woven into the nest, which, when completed, after about sixteen days' work, presented the most extraordinary appearance imaginable. Such a nuptial nest no squirrel ever had before, or, perhaps, will ever have again. I am sure they were proud of their achievement, and deemed it a triumph of squirrel architecture!

The family in due time came into the world; but any attempt to approach the nest was resented so furiously, yet combined with such evident terror for the safety of their babies, that I had not the heart to gratify my curiosity to see how many there were, and what they were like.

Nearly three weeks passed, when the love of prying overcame all other scruples, and a peep into the snug, cosy, chequered retreat was irresistible. Separating with the utmost caution the walls of the entrance-hole, three baby-squirrels were visible,—such queer little animals, they seemed all eyes and tail. The papa and mamma were both loud in their remonstrances, and frightfully angry at the impertinent intrusion; but as I did not touch the infants, and, as far as practicable, mended the torn entrance, why, it appeared to me there was not much ground for complaint.

Visiting my pets on the following day, imagine my surprise at finding the nest empty, and the old and young vanished together. First I thought some poaching weasel had murdered the innocents; but no—the old ones had carried them away into some other retreat, because I had looked at them, and meddled with the nest. Instinct here appears vastly near akin to reason; what had happened once, the 'Store-keeper' evidently *thought* might occur again, and wisely took the precautionary measure of concealment, selecting a spot unknown to the intruder.

Its name, 'Ogress Squirrel,' arises from a singular Indian tradition, that I think is quite

worth repeating, as it shows us how readily uncivilized man seizes on the supernatural to account for everything beyond his comprehension. Spiritual agencies and wild myths form subjects for the daily chat round the lodge-fire; everything becomes mysterious that is not understood; the very language of the red-man is a tangled chaos of symbols, figures, and metaphors. A prominent performer in all their legends is a terrible old woman, half witch, half ogress, of very doubtful reputation, armed with teeth like a wolf, and the claws of a grizzly-bear; her entire time spent in doing evil, eating children, and waging unceasing war on the good and virtuous.

To make the story brief, it seems this amiable old lady (at some period far away in the dim history of the past) spied a fat dainty young 'redskin,' the son of a brave and good chief, playing by the side of a mountain-burn, not far from the wigwam of his parents. With wily words of endearment, and holding out a basket filled with ripe berries and gaudy flowers, the witch-woman coaxed the baby-savage within reach of her terrible claws: as she clutched it, the father and mother saw their loved one's peril, too late to rescue, to save, beyond all

human power. There was but one chance, one last frail hope to cling to: falling on their knees, both prayed, and, in the agony of despair, besought the 'Great Spirit' to use his power and save their child—give it back to them, or change it into any form, so that it escape the teeth and talons of the dreaded ogress. The prayer was heard, and the boy, assuming at once the form of a tiny squirrel, deftly slipped from out her grip, but not unscathed; the marks inflicted by four of her claws remain to this day on its *back*, as evidence of the story's truthfulness.

Hence it is that Indian boys seldom kill this squirrel, ill-luck befalling all such profane transgressors, and that 'medicine-men' (the doctors and conjurors of the tribes) wear its skin as a potent and all-powerful charm.

The 'Store-keeper,' bearing on its back the marks of the wicked old woman's finger-nails, may be seen by any who choose to visit the British Museum, where a specimen I shot is set up very near the 'rock-whistler.'

THE DIPPER.

(*Hydrobata mexicana.*)

Like the well-known gallinule, or water-hen (*Gallinula chloropus*), the dipper swims and dives with great facility; the plumage, close and compact, is similarly adapted to resist moisture —a wise provision, enabling the bird to remain a long period in the water without becoming wet. It resembles the starling in the form of the beak, falcate wings, mellow song, and feet, constructed on the type of ordinary perchers; bill without any bristle at the base, somewhat long and slender, and bent slightly upward; the culmen concave towards the tip, which is notched and curved; feet and legs strong, claws large, lateral toes equal; tail very short.

The colouring of the British dipper's plumage, though somewhat inclining to the sombre, is nevertheless chaste and pretty. The crown on the upper parts of the head and neck shades imperceptibly away into the velvet-black of the back, scapulars, and wing-coverts. The breast, front part of the neck, and throat are snowy white; a rusty-brown line separates it from the

black. The legs are somewhat short, but very strong; the claws considerably curved, to prevent slipping.

Of most hermit-like and exclusive habits, the dipper loves to linger amidst the wildest solitudes of Nature, frequenting streams that push their headlong way through mountain-glens, or wind in tortuous course over the heather-clad moorland. It may, too, occasionally be seen briefly resting on the dripping spokes of the wheel when the mill stops, its low plaintive warble faintly heard above the splash of the water.

Every angler must be familiar with the dipper's song, always a welcome strain—not loud, but exquisitely sweet and melodious. Except during the breeding season, it rarely happens that two are seen together; they pair very early, and, before the ice is gone from the streams and pools, in the month of February, their nuptial choruses (as they fidget about, perched on a boulder, dead log, or projecting rock, bobbing their heads, or dipping) herald the coming spring. In the selection of their nesting-place they exhibit great diversity of taste. It may be placed in the cleft of a rock, in a ruined wall, among a mass of tangled roots, under a bridge,

close to a milldam, but always near running water. One I knew of was under a rude bridge on Dartmoor, wedged between two granite boulders; another by the side of a milldam in Cornwall, a third amongst the timbers of an old salmon-trap.

The dippers are most restless and active in their habits: ever flitting from spot to spot, always on the move, diving into the stream, out again—steadfast in nothing but continual change. The most singular trait in their versatile character is a power they possess, enabling them not only to remain for a long time under water, but walk about on the pebbles or gravel at the bottom of streams or pools, in search of larvæ and aquatic insects, just as a man in a diving-dress seeks for lost treasure round the hull of a sunken ship.

The late and ever-to-be-lamented naturalist, Mr. Waterton, thus commented on this most curious habit:—

'This is the bird whose supposed subaquatic pranks have set the laws of gravity at defiance, by breaking through the general mandate, which has ordained that things lighter than water shall rise towards its surface, and that things that are heavier shall sink beneath it. If the water-ouzel,

which is specifically lighter than water, can manage, by some inherent power, to walk on the ground at the bottom of a rivulet, then there is great reason to hope that we, who are heavier than air, may any day rise up into it, unassisted by artificial apparatus, such as wings, gas, steam, or broom-staff.'

Although the feet are strictly those of a percher, still the dipper can swim like a duck, and as I have often seen a diver spread its wings, and literally fly when under water; so this bird, in order to escape, if suddenly alarmed, frequently goes a long distance down-stream, using its wings beneath the water, much in the same manner as it would if flying through the air.

The poor little dipper has many terrible and implacable enemies; they saddle him with crimes and offences against the fisheries that he does not deserve, brand him as a poacher, offer rewards for his head, and ruthlessly take his life. Farmers, gardeners, gamekeepers, and managers of fisheries, actuated, I doubt not, by the purest motives for good, are nevertheless too prone to nail their best friends to the barn-door. Destroy the feathered police, and hosts of insect marauders, that laugh at guns, traps, poison, or rewards, will most surely mow down

your fields and forests, and play havoc with your fisheries into the bargain.

Believe me, it is not with any felonious intent that the dipper visits the spawning-beds. He would not give a chirp to breakfast on the daintiest fish-eggs that speckled trout or silver salmon ever laid. Fat larvæ, plump savoury water-beetles, and delicate young freshwater molluscs, are his delight; and he knows well the weakness such robbers have for new-laid eggs, and, like a sensible bird, goes where the eggs are, to find them—an obedience to instinct that often costs him his life.

I have opened the stomachs of dozens of dippers, when collecting for the purpose of Natural History (not only in this country, but in the United States, British Columbia, Texas, and Oregon, where all the streams are alive with salmon and trout), and never in a single instance did I discover other than the remains of insects and freshwater shells.

A Highland clan, a weed, and the ouzel are severally classed, in a quaint old distich (quoted in the 'Dictionary of Animated Nature'), as the direst enemies of the Moray. Thus it runs:—

> The Gordon, the guile,* and the water craw
> Are the very worst ills the Moray ever saw.

* Guile, a weed destructive to corn-lands.

I have thus referred to the English dipper to introduce its very near relation, inhabiting the far North-west. It, too, eschews all sociable communion, disdaining the slightest approach to a gregarious life except when mated, choosing invariably wild mountain-streams, where, amidst the roar of cascades, whirling eddies, and swift torrents, it passes its lonely life.

The American dipper (*Hydrobata Mexicana*) ranges from the coast to the summit of the Rocky Mountains. I have killed it at an altitude of seven thousand feet above the sea-level. In size it very nearly resembles the European bird, but differs greatly in colour; being of a uniform plumbeous grey, the only markings a minute spot above the anterior corner of the eye.

I once found the nest of the American dipper built amongst the roots of a large cedar-tree that had floated down the stream and got jammed against the milldam of the Hudson's Bay Company's old grist-mill, at Fort Colville, on a tributary to the Upper Columbia river. The water, rushing over a jutting ledge of rocks, formed a small cascade, that fell like a veil of water before the dipper's nest; and it was most curious to see the birds dash through the waterfall, rather than go in at the sides, and in that way get behind it.

For hours I have sat and watched the busy pair, passing in and out through the fall, with as much apparent ease as an equestrian performer jumps through a hoop covered with tissue-paper. The nest was ingeniously constructed, to prevent the spray from wetting the interior, the moss being so worked over the entrance as to form an admirable verandah.

Mr. George Gibbs ('Natural History, Washington Territory,') speaks of two he noticed whilst gold-washing on the Salmon river: 'As I sat at my cradle on the bank, a pair of dippers, which I suppose had their nest hard by, or perhaps, as it was July or August, had already hatched their brood, used to play in the water near me, sometimes alighting at the head of a rapid, allowing themselves to be swept under, and then rising below. They dive with great celerity, and at times beat the water with their wings, throwing the spray over themselves. Their whistle was sweet and rather sad, but they seemed very happy and busy fellows notwithstanding, and in nowise afraid of the harsh rattle of the "miner's cradle."'

CHAPTER IV.

NATURE OF COUNTRY FOLLOWING THE 49TH PARALLEL FROM THE GULF OF GEORGIA TO THE SILMILKAMEEN—GIANT TREES—SUMASS PRAIRIE AND LAKE—NORTHERN SWIFT—WHITE-BELLIED SWALLOW—THE YELLOW-BIRD—BARKING CROW—NORTH-WESTERN FISH CROW—HUDSON'S BAY MAGPIE—STELLER'S JAY—COUNTRY EAST OF THE CASCADES—THE OSOYOOS LAKES—NEW MUSK-RAT—FIBER OSOYOOSENSIS (LORD)—NEW SPONGILLA, SPONGILLA LORDII (BOWERBANK).

FOLLOWING the course of the 49th parallel from the Gulf of Georgia, to our astronomical station at Ashtnolow,* near the Silmilkameen Valley, is an unbroken forest with a thick and tangled growth of underbrush, in which there is little or no grass, or food of any kind for pack-animals; a deficiency we were compelled to supply by providing grain. Here and there so-called 'wet prairies' are met with, even at an altitude of 2,000 feet above the sea-level; but these marshy oases yield only the scantiest forage, being covered

* Previously alluded to, Vol. I.

with *Equisitaceæ*, and rank sour sedge-grass. The characteristic trees attaining to any magnitude on the western slope of the Cascades are the Douglas Spruce (*Abies Douglassii*),* Menzies Spruce (*A. Menziesii*), Hemlock Spruce (*A. Mertensiana*), *Pinus contorta*, and the useful so-called 'Cedar' (*Thuja gigantea*). Between the open bits of prairie are graceful groups of the large-leaved Maple (*Acer macrophyllum*), Vine Maple (*A. circinatum*), together with the waving Dogwood (*Cornus nuttalii*), and brilliant red and green Alders (*Alnus rubra* and *A. viridis*); whilst the river-banks and loamy valleys are shaded by clumps and rows of massive poplars (*Populus balsamifera*), under the larger forest-growths, Mahonia, Spireus, Ribes, Vacciniums, Gaultheria, and that most prickly and unpleasant plant named the 'Devil's Walking-stick' (*Panax horridus*), mingle their leaves and branches into an impenetrable tangle.

The first twenty miles of the Boundary-line takes nearly a parallel course with the Fraser

* Through patches of these gigantic firs, near the Sumass prairie, the axe-men had to cut the Boundary-line. The trees grew thickly together, and many exceeded 30 feet in circumference, and measured from 200 to 250 feet when stretched on the ground by the brawny choppers.

river, at an average distance from it of nine miles. This part of it is quite or very nearly a dead level, and very little above the sea, densely timbered, and terminating at the spurs of the Cascade Mountains. Here the Sumass prairie and its lake, so often referred to, are situated. The lake is ten miles long, and about four-and-a-half wide. I have already explained how the prairie is flooded, and that in June the water again subsides; after this the growth of the various grasses and sedges (*Cyperaceæ*) is rapid beyond anything I have ever witnessed elsewhere. In two months the grass attains a height of four and seven feet. As the water disappears, swarms of insects accumulate, as if by magic; birds of various species arrive to devour them, build their nests, and rear their young.

Amongst the earliest of these visitors I noticed the Northern Swift (*Nephocaetes Niger*, Baird). It was a foggy day early in June, and, the insects being low, the birds were hovering close to the ground. I shot four. The next day I searched in vain, but never saw the birds again until the fall of the year, when they a second time made their appearance in large numbers—birds of the year as well as old ones. From their habit of flying at a great height, it is extremely difficult to obtain

specimens. I believe I again saw this swift at Fort Colville.

In June I observed a very large number of swifts in company with about an equal number of goatsuckers (*Chordeiles popetue*); they were hovering at a great altitude. After waiting a very long time, I succeeded in obtaining one goatsucker. The swifts never came within shot; neither did I ever after see them. On opening the goatsucker, its stomach was perfectly gorged with winged ants. I have no doubt this was the attraction which delayed the swifts on their northern route; and from the fact of their disappearing here, as they did at Sumass, I imagine they go far north to nest; had they bred anywhere along the Boundary-line, I am sure I must have discovered them.

White-bellied Swallows (*Hirundo bicolor*) are always in great force, and make their nests of ducks' feathers, in holes either bored by themselves, or the work of woodpeckers, in the tottering old willows that grow round the oozy margin of the lake. Flycatchers, sedgebirds, and a host of other summer migrants, specified in the Appendix, take up their respective hunting-grounds, and commence domestic duties.

One of the most conspicuous of the smaller

finches is the Yellow-bird (*Chrysomitris tristis*, Bon). This tiny finch—robed in golden-yellow, delicately shaded and streaked with rich brown, a velvet black cap on its head, and just enough white as a fringe to light up the dark tail and wing-feathers—may be ranked as the most exquisitely-plumaged of North-western birds. One could almost imagine, as it silently climbs amidst the green foliage of the pines, that it was an orchid-blossom blown from the tropics into colder regions, rather than a bird.

As a singer the 'yellow-bird' has little to boast of—as an architect it is deserving the highest credit. The nest is a perfect work of art, most delicately woven, in shape symmetrically round, and skilfully lashed with real ropes of fibre to the forked branches chosen as the building-site.

Fine linty materials gathered from different plants, thistledown, spiders' webs, and silk pillaged from insect cocoons, make up the walls; the inside, lined with feathers, hair, and soft fibres, is a bed fit for a fairy-queen to sleep in. Five eggs are usually laid in June or early in July, soon after the birds make their appearance. They are distributed plentifully throughout British Columbia, and are sometimes seen on Vancouver Island, but were more abundant east than west of the Cascades.

As a contrast to this and other gay-looking birds, hosts of crows take up building-lots in the thick thorn-bushes and lofty pine-trees. The latter position is chosen by the Barking Crow (*Corvus americanus*).

If birds are gifted with ventriloquial powers, I should say the Barking Crow was at the top of the profession. Wandering through the forest encircling the prairie, one's ears are dinned by the extraordinary sounds made by these crows. Sometimes it seems as if these hidden polyphonists were making all sorts of disagreeable fun of you, and chuckling hoarsely at their own jokes; then one goes in for a 'bit of a song,' and others readily taking it up, they manage between them to raise, as a refrain, a combination of discords compared to which the parrots' screams in the Zoological Gardens is whispered melody. They shriek, laugh, yell, shout, whistle, scream, and bark—driving one to wish all the crows in British Columbia were consigned to the depths of Hades. If listening eagerly for the note of a bird you are most wishful to discover, a Barking Crow is pretty sure to perch close over your head and begin its unearthly noises; or if enjoying the notes of a forest minstrel, its songs perhaps quite new to the ear, in comes a crow with its husky gurgling

chorus, and spoils the melody. If reposing on the soft warm sandy beach in dreamy reveries, listening to the lip-lap of the ripple, and thoroughly enjoying the quietude of surrounding nature, a flock of roystering crows are sure to alight on the rocks close by, and do their best to display their vocal capabilities. It surely must have been one of the British-Columbian crows that quaint old Æsop knew!

They also go farther inland to breed, building their nests of sticks in low bushes, often not four feet from the ground, where there are no tall trees. I saw one little stream, east of the Cascades, where the low alder-bushes growing along its banks were quite as thickly filled with the nests of the Barking Crow as the trees in an English rookery are with rooks' nests. I could look into some of them, and into all readily put my hand without climbing; the sticks are neatly crossed and piled together, and the interior lined with grass stalks, hair, bits of lichen, and dry leaves; the nests are open at the top, and five was the greatest number of eggs I saw in a nest. The Barking Crow is found in every part of British Columbia or Vancouver Island, and the lesser islands in the Gulf of Georgia; simply changing their quarters from

the forests to the seacoasts during the winter months, when they live entirely on molluscs, crustaceans, dead fish, or anything else procurable from Neptune's realms.

A near relative arrives at the same time, and takes up its quarters in the thick scrubby white thorns—the North-western Fish Crow (*Corvus caurinus*, Baird). This much smaller crow Dr. Baird has described in his valuable book on North American Birds (page 569). But he says, in finishing his specific descriptions, 'Indeed, it is almost a question whether it is more than a dwarfed race of the other species.'

I have not the slightest doubt that it is a distinct species, although so very like the Barking Crow in all its essential features, as far as colour, form of bill, scaling of tarsi, and other details are concerned. The much smaller size, difference in voice, and habit of constructing a domed nest lined with mud, are constant characters of sufficient value to justify Dr. Baird's specific difference. These small crows are principally found on the seacoast, retiring to the trees to sleep and caw during high-tide; following out its ebb, and receding before its flood, they feast on any marine provender they may be lucky enough to find. They never make such a

discordant babel of sounds as their friends and companions the barkers, but *caw* much as do our jackdaws.

The seacoast is abandoned when the breeding-time arrives, early in May, when they resort in pairs to the interior; selecting a patch of open prairie, where there are streams and lakes, and the wild crab-apple and white-thorn grows, in which they build nests precisely like that of the magpie, arched over the top with sticks. The bird enters by a hole on one side, but leaves by an exit-hole on the opposite. The inside is plastered with mud; a few grass-stalks strewn loosely on the bottom keep the eggs from rolling. This is so marked a difference to the Barking Crow's nesting, as in itself to be a specific distinction. The eggs are lighter in the blotching, and much smaller. I examined great numbers of nests at this prairie, and on the Columbia, but invariably found the same habit of doming prevailed. After nesting, they return with the young to the seacoasts, and remain in large flocks, often associated with the Barking Crows, until nesting-time comes again. During their sojourn inland, their food consists principally of small reptiles, freshwater molluscs, or grubs; and I have seen them catch butterflies flying near their nests,

which are placed low down, but in the centre of a very thick prickly bush—a stronghold rigidly guarded against all-comers. Not even a small bird dare perch on that sacred bush; and if hawk or weasel venture to poach for eggs or young birds, husband and wife dash fearlessly at the thief, and ring such changes on its head or body with their powerful beaks, that victory generally lies on the side of the crows. Seven is the greatest number of eggs I ever found in a nest, five and six being the average. I saw it north at the extreme end of Vancouver Island, but do not imagine that to be its limit. Its southern range (I only speak from personal observation) was Cape Flattery; whether it extends along the coasts of Oregon and south of California, I do not know.

Very often magpies (*Pica Hudsonica*) build in the bushes, as close as safety permits them to venture near the belligerent Fish Crows. These thievish murderers are everywhere, from Vancouver Island to the Rocky Mountains. They so very nearly resemble our British bird, that one would know no difference save by a careful comparison; seeing them in freedom, they appear to be identical. I call them murderers, because I have seen them kill mules: and worse than that, pick the

eyes out of a living animal when, wounded and helpless, it lay down to die; and pounce on maimed birds, break in their skulls, and deliberately devour their brains whilst the muscles still quivered with life.

To the packer the magpies are dire enemies. If a pack-mule or horse has a gall, and happens to be turned out to graze with the wound uncovered, down come the magpies on its back; clinging with their sharp claws, reckless of every effort to displace them, they peck away at the wound; the tortured beast rolls madly, and for a short time the scoundrels are obliged to let go, but only to swoop down again the instant a chance offers. This repeated agony soon kills an animal, unless the packers rescue it.

We had frightful trouble with magpies at our winter mule-camp, near Colville. They gradually accumulated, to eat the offal and what there was besides, until they were in hundreds, and became perfectly unbearable. Shooting at them was only wasting valuable ammunition. The packers were driven almost into a state of revolt. We had an old maimed suffering mule which was to be killed, so the packers gave it a ball containing a large dose of strychnine: death was immediate, and the carcase, ere ten minutes had

elapsed, was covered with magpies working at the eyes, lips, sores, and soft skin inside the thighs. It was the most singular spectacle I ever witnessed. One after the other the birds rolled from off the dead mule, and as they fell and died, others greedily took their vacant places; and so this terrible slaughter went on, until the heaps of dead magpies nearly buried the body of the mule. Two foxes, one cayote, several Indian dogs, and a large wolf, on the day following the mule's demise, lay dead by the side of the poisoned birds. It was a terrible revenge—how far justifiable is a matter of opinion. The packers, of course, were in wild glee at the entire success of the scheme.

The magpie builds much the same kind of nest as our British species, lays seven or eight eggs, and commences nesting in March, long before the snow begins to thaw. Numbers winter in the interior, whilst others resort to the seacoast, and feed on marine provender. They grow so tame and impudent in winter, that I have often given them food from my hand, without their showing any evidence of fear.

Steller's Jay (*Cyanura stilleri*) makes its presence known by the continual utterance of a discordant scream; hopping perpetually from bough

to bough, then darting down to nip an insect, performing short erratic flights, and jerking its crest of bright feathers up and down, its noisy song seems everywhere. The Blue Jay appears the embodiment of restlessness, and by sheer impudence attracts attention from even the lone hunter. Fond of frequenting the haunts of man, jays are always plentiful near Indian lodges or white men's shanties. By no means epicurean in tastes, they readily devour anything—seeds, salmon, grasshoppers, or venison. The nest, artfully concealed amidst the thick foliage of a young pine-tree, is composed of moss, small twigs, lichen, and fir-fronds, and lined with deer-hair. Seven is about the average number of eggs laid.

On reaching the eastern slope of the Cascades, grass becomes abundant, and dry fodder is unnecessary. Trending eastward to cross the Similkameen Valley, and thence passing the Osoyoos lakes, grass is all the way abundant, and the vegetation evidences a very much drier climate; instead of dense impenetrable forest, the trees are sparsely scattered. Leguminous plants, valerian and others, give a marked character to the general herbage. On reaching the Na-hoil-a-pit-ka river, which bends in a southerly course

to join the Columbia, a short distance above the Kettle Falls, mountains again commence; and from this point to the summit of the Rocky Mountains, the Boundary Line crosses a succession of mountain ranges, with narrow valleys (often only rocky ravines) between them. The illustration, taken from a photograph of one of our camps amidst this chaos of rocks and trees, shows how arduous the task of marking and cutting the line through it really was.

I must linger a short time at the Osoyoos lakes. This magnificent piece of water may be defined as one large lake, or three smaller ones, with equal correctness; as a narrowing-in, at particular points, gives the appearance of an actual division into separate lakes. The Boundary Line runs through its centre, so that one half the lake belongs to England (its northern half), the southern to the United States. The shore is sandy, like a seabeach, and, strewn thickly with freshwater shells along the ripple line, has quite a tidal aspect. On either side, a sandy treeless waste stretches away to the base of the hills, and so carpeted with cacti—which grow in small knobs, covered with spines, like vegetable porcupines—that walking on it, without being shod with the very thickest boots, is to endure

indescribable torture; the prickles are so sharp and hard, that they slip through ordinary leather like cobblers' awls. We had to tie up our dogs and horses, for the latter, getting the prickly knobs into their heels, kicked and plunged viciously until exhausted. The dogs got them fast to their feet, and, impatiently seizing the vegetable pests, only aggravated the mischief by transferring them to the tongue and cheeks. I have no hesitation in saying, a dog must inevitably die from starvation if he ventured to cross this waste alone; the cacti once in his mouth, unaided he could never free himself. A low 'divide' separates this valley from the Similkameen, the water from the lakes eventually finding its way into the Columbia river. If there is an Eden for water-birds, the Osoyoos lakes must surely be that favoured spot. At the upper end, a perfect forest of tall rushes, six feet in height, afford the ducks, grebes, bitterns, and a variety of waders, admirable breeding haunts—safe alike from the prying eyes of birds that prey on their kindred, and savages that indiscriminately eat anything.

The water, alive with fish at all times, is in the summer crowded with salmon. In the pools on one side of the lake, I obtained a new

species of musk-rat, which I have named *Fiber osoyoosensis*.

The Musk Rat, which I believe is the well-known *Fiber zibethicus* of Cuvier, makes its holes in the clayey banks of streams and pools where the water runs slowly. The entrance is always below the surface, the hole dug up in a slanting direction above the water-level. A stage or flat place is cleared, which constitutes the dining-, drawing-, and bed-room; leading to the entrance of this mansion are a number of open cuttings, running in all directions, dug in the mud at the bottom of the water. When foraging about, as the musk rat usually does about twilight, if alarmed, it dives at once into one of these cuttings, and, rushing rapidly through, stirs up the mud, thus fouling the water, and completely and effectually concealing itself.

The other Musk Rat, which I call *Fiber osoyoosensis*, differs in size, colour, and structure, but particularly in habits, from the preceding. This fellow chooses as his haunt a clear pond or lake, and in water from three to four feet deep constructs a house of bulrushes, in form conical, built up from the bottom—how I am at a loss to imagine—the roof cleverly arched over into a domed shape, and raised about a foot above the

water. Up in this dome, skilfully constructed, is his suite of apartments, the entrance to which is far below the surface of the water. His habits very nearly approximate those of the beaver: he swims about boldly in the daytime, but dives rapidly on the approach of danger. If a dead or badly-wounded duck be left on the pool, it is at once seized on, towed into the house, and devoured.

I am quite satisfied, from careful observation, that the Musk Rat is a carnivorous beast whenever he has a chance; and the straight, sharp-cutting, strong incisor-teeth are well adapted for the indulgence of cannibal propensities.

If there were no rushes growing where this mud-rover lived, it might be assumed that he dug a hole into the bank from lack of material to build a house; but I have often seen the rushes growing abundantly where he has chosen his mud hut, offering every facility for architectural pursuits, had he so willed. On the other hand, had the rush-builder been precluded from finding a mud-bank in which to construct his mansion, it might have been supposed that he had resorted to making a hut with rushes on that account.

FIBER OSOYOOSENSIS. (LORD, *sp. nov.*)

Sp. char.—In total length 3¼ inches shorter than *Fiber zibethicus* (Cuv.); in general size much smaller. General hue of back jet-black; but, the hair being of two kinds, if viewed from tail to head it looks grey—the under fur being fine, silky, and light-grey in colour; concealing this on the upper surface are long coarse black hairs; the belly and sides somewhat lighter; head broad and depressed; neck indistinct; ear small, upper margin rounded; eye small and black; the feet, legs, and claws are so exactly like those of *Fiber zibethicus* that it would be useless to describe them again; whiskers long, and composed of about an equal number of white and black hairs; incisors nearly straight, on the external surface orange-yellow.

The skull differs from *Fiber zibethicus* in being much smaller, 2⅛ inches in length, 1⅛ inch in width, very much shorter from the anterior molar to incisors; nasal bones much more rounded at their posterior ends, the superior outline less curved; postorbital process not nearly so much developed; the cranial portion of the skull in its upper outline is much less concave, and smoother; superior outline of occipital bone not so prominent or strong; incisors shorter and much straighter; molars much smaller, but in general outline similar.

In this lake I obtained a new species of fresh-water mollusc, which Dr. Baird, who kindly described it for me, named *Succinea Hawkinsii*, in honour of the Commissioner, Colonel Hawkins. It will be found carefully described in the Appendix.

I also observed a spongilla growing round the stalks of the rushes, much larger, and more sponge-like in character, than any spongilla I had previously seen. There was no lack of it in many places; the rush-stalks were all covered with it,

from their root-hold to the water-level, a length of two feet, and often more. This spongilla Professor Bowerbank has kindly described for me since my return. I cannot do better than append the Professor's description:—

'SPONGILLA LORDII. (BOWERBANK, N. S.)

'Sponge sessile; coating surface even, smooth; oscula simple, dispersed. Pores inconspicuous; dermal membrane pellucid, aspiculous; skeleton specula, acerate. Ovaries congregated on the basal membrane, very numerous; specula entirely spined, fusiform, cylindrical, dispersed on the surface. Basal membrane abundantly spiculous; specula dispersed same as those of the ovaries. Colour ochreous, yellow to green. Examined in the dried state.

'The sponge embraces the stems of a large species of reed for eight or ten inches of its length, and is about six or nine lines in greatest thickness. In its general habit, and the structure of its skeleton, it closely resembles our British *Fluviatilis*; but it differs from that species in the mode of disposition and structural peculiarities of the ovaries, which more closely resemble those of our British species *S. lacustris*, but from which it differs in having the specula of the ovaries nearly straight, while those of the last-named species are usually arcuate. The dermal membrane of *S. lacustris* also abounds in entirely-spined tension specula, while that of *S. Lordii* is aspiculous.

'This species is interesting, from its close alliance in structure to the European type of this genus, and from the very slight structural resemblance it has to the numerous species of the Amazon river; the principal character by which it is connected with the latter series of species being the mode of the congregation and disposition on its basal membrane of its very numerous ovaries.

'I have dedicated this species to Mr. J. K. Lord, as a slight acknowledgment of the good services he has done to science by the collection of this and numerous other valuable specimens of Natural History, from the unfrequented regions which he has explored.'

CHAPTER V.

REJOIN THE COMMISSION—JOURNEY TO WALLA-WALLA AND BACK —SCENERY OF THE UPPER COLUMBIA—OLD FORT WALLA-WALLA — WALLA-WALLA INDIANS — NEW WALLA-WALLA CITY — THE HORSE-FAIR — INDIAN MUSTANGS — CURIOUS CUSTOM OF THE SIS-KY-OU INDIANS — THE AMERICAN GARRISON — AN UGLY ADVENTURE — OVERLAND TRIP TO WALLA-WALLA — CEDAR SPRING AND THE SHORE-LARKS — SAGE COCK, OR COCK OF THE PLAINS — TOWNSEND'S GROUND-SQUIRREL — A DIFFICULT MARCH—THE PRAIRIE HARE—CASTLE AND CHIMNEY ROCKS— REACH WALLA-WALLA.

We have rejoined the Commission at the Dalles; one party has proceeded up the west or right bank of the Columbia, there to strike off in a northerly direction for Fort Simcoe, in order to reach the point at which the Boundary Line had been abandoned the previous year; it being more expedient to ascend the Columbia, in order to get east of the Cascades, than it was to transport so large a party, with mules, across their serried heights

We are to keep on the left bank of the Columbia, proceeding first to Walla-walla; thence,

taking a northerly direction, to cross the Snake river, where its tributary, the Peloose, joins it; then, passing by the Big Lake, travel due north to Fort Colville. It will facilitate description to resume my journal:—

June 5.—I start alone for Walla-walla. A stage from the Dalles takes me to the Des Chutes or 'fall' river, where I embark in the 'Colonel Wright,' a small crank steamer propelled by an enormous stern-wheel. The Columbia river was in full flood, and rushing down with terrific force made our progress tediously slow. We were well out in the current, when there was a hue-and-cry that the wood-pile was on fire; luckily it did no harm—the burning logs were dragged out and thrown into the water. More dismal scenery can hardly be imagined—not a tree or shrub visible—nothing but grass dry as hay, and level sandy plains. At Sundown the vessel is made fast to some stakes driven into the bank, there being nothing else to moor her to.

June 6.—The splash of the stern-wheel and creak of machinery awake me; we are again struggling against a terrific current, and the wind blowing a gale dead ahead. The same monotonous shrubless waste—nothing to interest or amuse, save the excitement of twisting and

struggling through rapids, and watching the 'deck hands' take in wood at the different 'wooding stations.' The boilers are heated with wood only, which is hauled by ox-teams from the nearest forest or timbered district, often many miles: cutting, cording, and hauling the wood requisite for the trip from the Des Chutes to Walla-walla is a very heavy item.

We pass the mouth of John Day's river, the Umatilla, and several other tributaries. Where the rivers joined, small encampments of Indians were busy fishing, but we did not go sufficiently near to see what fish they were taking. As we get farther up-stream, colossal piles of basaltic rocks, naked and cinderous, appear to have grown from out the sand; quaint are the shapes these masses assume, and from resemblances really startling are named Chimney-rocks, Castle-rocks, Turret-rocks, and so on, as they suggest some well-known object to the traveller. The weariest day must have an ending; at night we tie up as before, only twelve miles below old Fort Walla-walla—our destination.

June 7.—We are at old Walla-walla, 5.30 A.M.; wind blowing a hurricane, and carrying along with it sand, and even small pebbles. The landing is effected on a kind of floating pier; and

whilst the stage-driver is harnessing his mustangs, I take a peep at the old fort, or rather what remains of it, which is a square enclosed by adobe (mud) walls loopholed, and once guarded by massive gates; but these are gone, as are the houses of the fur-traders that the crumbling old walls protected in the early days of the Hudson's Bay Company.

The Walla-walla Indians, at the time the Hudson's Bay Company established this most desolate trading-post, were a wild and powerful tribe, very hostile and averse to the Company's trading. After several severe fights, in which many lives were lost on both sides, the traders abandoned the fort during the Sis-ky-ou war, in the year 1836. Whisky, disease, and forays with white men and neighbouring Indian tribes has so reduced the once-dreaded Walla-wallas, that a few broken-spirited lazy horse-thieves are their only representatives to be met with. The Walla-walla river joins the Columbia close to the steamer-landing.

I endure the usual amount of stage discomfort, in passing over thirty miles of the most miserable forlorn-looking country I ever beheld. We reach New Walla-walla city about dusk; the city is one straight street about a quarter of a

mile in length, consisting principally of grog-shops (or groceries), tawdry bar-rooms, billiard-saloons, a few stores, and 'Corals' for putting horses in. The throng in the streets consists of half-naked savages, with their squaws and children, gold-miners, settlers, American soldiers, and rowdies of all sorts. I learn there are two causes to which this extraordinary city owes its existence: first, the establishment of an American garrison, to protect the settlers in Washington Territory from Indian incursions, which garrison is about a mile away; and secondly, the rumours of rich gold-placers in the Blue Mountains, a little to the southward.

I met my friend, to whom I had letters of introduction, and slept at his house, about a mile from this den of villany.

June 8. — The news that I was a Government Agent, seeking mules and horses, spread like a prairie-fire; and Walla-walla, as I enter it this morning, is a perfect horse-fair. Sis-ky-ous, Walla-wallas, Nez-perces, and Indians from various smaller tribes, living on the Columbia and its tributaries, were dashing wildly up and down the street—some on bare-backed horses, others having a rude kind of saddle: all are yelling, whooping, and flourishing their lassos,

like maddened fiends. Hoping to attract my attention, they ride much closer than seems quite consistent with my personal safety. So I ensconce myself in a 'Coral,' and contemplate the fair over the strong railings quite as agreeably and very much more safely than outside.

Half-naked savages, one after another (often two or three together), dash up to the rails, and fling themselves from off the panting horses; run their hands down the length of the horse's back, to show it has no galls or sores; tickle its flanks and creep under its belly, to demonstrate its docility; drag open the lips, to show the teeth; invariably ask four times the sum they intend to take; give a frantic yell on being offered less; spring again upon the horses' backs, to gallop furiously about, until, tired of further exhibition, and hopeless of exacting a larger sum, they ride quietly to the 'Coral,' turn in the horses, and receive payment. The detail of all my bargainings would afford the reader but little interest; suffice it to say, I made many purchases, and afterwards adjourned to the American garrison.

It is difficult to say when horses were introduced into the Indian country west of the Rocky Mountains, but most probably about the commencement of this century. They are clearly

descended from Spanish stock—stout, compact, enduring animals, seldom exceeding 15 hands, 14½ hands being about the average standard of height. Spotted horses are very common, and much prized by the squaws.

The Sis-ky-ou Indians have a singular custom of cutting off the tails of the horses to a mere stump, and cropping the ears, as terrier-dogs are trimmed by the 'Fancy.' For what purpose such barbarous treatment is resorted to I could not discover, but I imagine it enables them more readily to identify their horses in case of theft. I purchased a crop-eared tailless horse, for my own use, but the poor animal suffered so fearfully from the punctures of musquitos and sand-flies, having no tail to whip them off, that I could not ride him in fly-time.

I am most hospitably treated by Colonel Wright, the commandant of the American garrison, which consists of a number of very neatly-built houses, arranged in a square. Four companies, consisting of infantry and cavalry, are sometimes stationed here. The officers have a capital billiard-room, and a small theatre for amateur performances. The situation is desolate in the extreme—nothing visible in any direction but a wide sandy extent of barren treeless country,

save a dim dark line bounding the horizon to the right, which I am told are mountains, from which all the wood used in the garrison is dragged by mules and ox-teams. I spend a delightful evening, and sleep at Captain Dent's.

June 9.—I am again *en route* for old Walla-walla, to catch the steamer. The stage has no other passenger. I can see by the black masses of cloud, rolling like huge waves one after another, that a storm of no trifling nature is about to break over us. It rapidly darkens, and the first flash of lightning hisses through the stage, followed instantly by a deafening peal of thunder; the wind, as if suddenly let loose, rushes across the waste, carrying with it sand enough to bury one; flash follows flash so rapidly, that the dismal plain seems permanently lighted; the crashing thunder-claps completely overpower all other sounds, and the rain begins to pour down in a very deluge.

The storm does not last long; but the driver, blinded by the sand, and the glare of the lightning, has missed his way, and we are clearly in the Walla-walla river. The stage fills rapidly. I dash open the door, determined, at least, to have a swim for my life; there is a terrible scrambling of the horses, accompanied with a

heavy lurch, a cheery 'All right, Cap.!' from the driver, which tells me we are again on terra firma. We hold a council, and determine to unharness the mustangs, and await the daylight. It certainly was the most miserable night I ever passed; wet, cold, and hungry, my miseries were enhanced by the fear of missing the steamer, and being detained perhaps a month.

June 10.—It was fortunate we did not attempt to proceed; we are far away from the road, and, as I suspected, had made a short voyage in the Walla-walla river. Luckily, the banks being low and shelving, the horses were enabled to scramble out, and tug the stage after them. We saved the steamer by the merest chance, and I am again on board. Going down the river is a very different affair to coming up. We go at such a rate, that the wheel at the stern is next to useless; through some of the swifter rapids it is quite like flying; if a rock should be touched, we shall be food for the fishes. What occupied us three days to accomplish up-stream, we do in six hours down. I reached my camp at the Dalles about seven o'clock in the evening.

Three days were occupied in making the necessary arrangements for departure.

June 14.—We start again for Walla-walla, this

time by land. The Commissioner, nineteen men, and thirty-two laden mules, complete our party; the others, with some heavy baggage, are gone by the steamer, to await our arrival. We cross the Fall-River on a very creditable wooden bridge, for which the modest sum of half a dollar, (two shillings) was demanded for each animal, packed or ridden. (This bridge, soon after, was completely swept away by a heavy flood.) Thirty-four bullocks, driven by two mounted herders, formed a kind of rearguard.

We made a twenty-mile march, and camped at Mud Creek—a dismal place, with little or no wood, and very bad water.

When tents are used, getting away in the morning is always a tedious process; we start about seven o'clock. For some distance we wind through a series of rounded hills, covered thickly with 'bunch-grass,' a most nutritious herbage; the grass grows in tufts—hence the name. Not a shrub to be seen—neither bird nor beast. Descend a basaltic gorge, like an immense canal cut in the solid rock, and come suddenly on a swift stream, named John Day's river; this we ferried in a kind of scow, hauled from side to side by a rope. Again we had to pay two shillings a head for mules and horses; the bullocks swam it.

June 15.—Made a short march, and camped early, near some stunted juniper-trees, where a small stream of water literally squirted out from the side of a steep bank; it is the only water within a long distance, and the place bears the name of Cedar Springs, as the junipers are called cedars by the traders.

It was most interesting to watch the Shore Larks (*Eremophila cornuta*). As evening approached, they actually came boldly in amongst the men and mules, intense thirst overcoming all sense of fear. These handsome little birds are very plentiful throughout British Columbia. They nest very early on these sandy plains, even before the snow leaves the ground. I saw young birds early in May. Near this spring I saw the Cock of the Plains, or Sage Cock (*Centrocercus urophasianus*).

I scarcely think this handsome grouse can be strictly included amongst British-Columbian birds, although its northern range is very near the Boundary Line on the right bank of the Columbia river; still, I only know of its existence west of the Rocky Mountains, in Washington and Oregon Territories. I met with it before, on the sandy plains near the head-waters of the Des Chutes river, and know of its being found

on the right and left banks of the Columbia, to the Spokan river on the one side, and the Yakima on the other.

These grouse live entirely on the open sandy plains, their principal food being the wild-sage (*Artemisia*), which imparts such a rank unpleasant flavour to the flesh, that one might almost as well chew the bitter bush as eat any part of a sage-cock. It is almost impossible to obtain the cocks in full nuptial costume, when their necks are fringed with the most delicate pinnated feathers. The meeting of two cocks is sure to result in a fight, during which the greater part of these ornamental feathers are usually torn out. Unless the birds are killed prior to a hostile encounter their plumage is never perfect, as they only have these fine neck and back-plumes at mating-time.

It is impossible for anyone to avoid being at once impressed with the extraordinary adaptation of the sage-cock's colour to the localities in which it lives; the mottlings of brown, black, yellow, and white, are so exactly like the lichens covering the rocks, the stalks of the wild-sage, and the dried leaves, bunch-grass, and dead twigs scattered over the sandy wastes, that it is impossible to make them out to be

birds when they clush close to the ground. Their greatest enemies are eagles and large falcons, which, ever soaring over the plains, or, perching on some lofty rock-pinnacle, scan the far distance for any moving objects on which to pounce. The poor sage-cocks have no shelter; not a tree or shrub, save the pungent sand-plant, is there to hide them; but their marvellous coloration compensates for lack of other protection, deceiving even the sharp-eyed birds of prey. They nest early in May; the eggs are laid on the bare ground, at the foot of a sage-bush, or under a shelving rock. They remain on the plains during the winter, becoming at that time nearly white, as do the ptarmigans.

The only animal I saw was a small rodent, or ground-squirrel (*Spermophilus Townsendii*). This small but handsome little animal is found in great numbers on all these arid plains. The Spokan river appears to be the limit to its range towards the Rocky Mountains. Its food must mainly consist of the wild-sage and grass, as nothing else grows here. What its northern range may be I do not know, but south I have seen it in Oregon down to the Shasta plains. How it obtains *water* I am at a loss to imagine, for I have seen it often on these dry sandy plains,

where thirsty nature had not even dew to drink, and miles away from water. They dig small holes in the sand, at the mouth of which they sit on their haunches, like a begging-dog. On the least alarm, one gives a shrill sharp whistle, when all take headers into their burrows. In winter they hybernate, coming out about the middle of April.

June 16.—We camped near a rough kind of farm, on a small stream called Cow creek.

June 17.—Still the same sandy treeless district. To-day the sun really scalds us. A fresh breeze blows in our faces, but only adds to the general discomfort—by filling every pocket with fine dust, inflaming the eyelids, and making one's mouth feel as if a piece of grinding-stone had been chewed for luncheon. My poor dogs suffer dreadfully; fourteen miles from water to water, over hot sand, completely exhausts them. They make known their griefs by whining piteously, laying down, and imploring me to give them water. I know what my poor dumb friends mean as well as if they proclaimed their wants in words, and cheer them on by giving them a little water from my canteen, converting my soft felt hat into a drinking-basin.

As we ride on, I notice what I at first imagined

must be the droppings of a large flock of sheep covering the ground thickly, just as though the animals had been folded. I had barely time to think what animal could be so abundant, when the dogs, tired as they were, started two or three large hares from under the wild-sage bushes. We saw numbers of them, and shot several; but the flesh tasted so strongly of the wild-sage, on which these hares mainly subsist, that eating it was an impossibility. The Prairie Hare (*Lepus campestris*) appears entirely confined to these sandy desert-lands, being replaced by the Red Hare (*L. Washingtonii*) in the timbered districts.

The fur of the Prairie Hare is long and silky, and exactly the colour of the sand and dead leaves under the bushes where they make their 'forms;' unless they move, it is impossible to distinguish them, although looking down on their backs. The ears are quite a fifth longer than the head. In summer, the colour of the back, sides, throat, and limbs is grey, varied with yellow and brown markings; tail quite white, above and below; ears yellow on the outside, but tipped with black, thinly covered inside with long white hairs; belly quite white. In winter the hairs change to a pure white; the colouring-matter is absorbed, and

the animal adapted to the snowy garb of winter, without the trouble of changing its coat.

We ascend a short hill, and from its summit gaze on the long-desired water; but, misery of miseries! in the pool (only a very small one) are six Indian horses, pawing and splashing, whilst their riders, squatting close by, are indulging in a friendly pipe. This, in itself, was enough to aggravate any thirst-famished man, but, worse than all, our dogs, the instant they caught sight of the water, rushed off, in defiance of shouts and threats, and helter-skelter dashed into the pond. Not content to stand and lap, like well-conducted dogs, they rolled in the water, and so frightened the horses, that together they managed so to stir up the bottom, that drinking was impossible, unless liquid mud were swallowed. There is nothing to be done but to dip some water into a pail, and wait for the thickest of it to settle.

This is certainly the most dismal camping-place I ever beheld. The Indians at the pool are Umatillas, and live near the junction of the Umatilla and Columbia rivers—a small peaceful tribe, living principally on fish, sage-cocks, and prairie-hares.

My journal records nothing of interest until

June 21.—We pass the masses of rock I had

previously seen from the deck of the steamer, Castle Rock and Chimney Rock—black columnar pyramids, which appear to have dropped down upon the sandy plains, rather than to have been upheaved from below—bare and naked, without even a coloured lichen to break their sombre cinderous uniformity. These basaltic mountains serve but to intensify the desolation of this interminable wilderness. Our course is now along the bank of the Columbia, that rushes on, muddy and turbulent, to reach the Walla-walla, which we follow up for about two miles, to meet our party, that had been sent by steamer; find them comfortably encamped, and enjoy a few days' rest, after our sandy, frying, dismal trip.

CHAPTER VI.

THE GREAT PLAIN OF THE COLUMBIA—POND TURTLES AND THEIR NESTS—THE SAGE RABBIT—FIND CURIOUS STONE IMPLEMENTS—A TRADE IN FLINTS AND MARINE PRODUCTIONS AT SOME REMOTE PERIOD, AND A SKULL (VIDE ILLUSTRATION) UNALTERED BY PRESSURE—LEAVE WALLA-WALLA—CROSS THE SNAKE RIVER—PELOUSE INDIANS AND THEIR HORSES—FALLS OF THE LOWER PELOUSE—A DISAGREEABLE INTRUDER—PLEASANT TO SEE TREES AGAIN—SAND-FLIES—BREEZE-FLIES—CLARK'S CROW—THE SPOKAN RIVER—WALKER'S PRAIRIE—PARRY'S GROUND-SQUIRREL—THE WAY THE THREE SPECIES OF GROUND-SQUIRRELS REPLACE EACH OTHER ON THE PLAIN—PARKMAN'S WREN AND ITS NEST—NUTHATCHES—THE TITS—DEAD MAN'S PRAIRIE—ARRIVE AT FORT COLVILLE.

THE great plain of the Columbia over which we are travelling, though its name gives the impression of a uniformly level surface, has, nevertheless, its mountains and valleys. Its northern boundary is an irregular line between the parallels of 48° and 49°; southward it merges into and is continuous with the central plains of Oregon, and thence extends to Salt Lake City, in Utah Territory.

The vegetation indicates a much drier climate than that of the western side of the Cascades.

Dr. Lyall says,* in reference to this plain: 'A good many plants found in this region are strictly local in their distribution. Excepting by the banks of lakes or streams, there are no trees; and some of the orders, such as *Ranunculaceæ*, *Caryophyllaceæ*, *Portulacaceæ*, *Rosaceæ*, *Crassulaceæ*, *Saxifragaceæ*, *Vacciniaceæ*, *Orchidaceæ*, *Liliaceæ*, &c., which species are so plentiful in the first region, have comparatively few representatives; whilst others, such as *Leguminosæ*, *Onagraceæ*, *Polemoniaceæ*, &c., are more common in this district, and give a character to the vegetation.'

Difference of elevation in the plain regions have each their peculiarities. The spurs of the Cascades are usually too dry for even good grazing-ground—their summits rocky, barren, and sparsely timbered. A strip of land immediately adjoining the Columbia, where it receives the waters of the Spokan, offers, however, good grazing-grounds for the Indian horses.

In the grass surrounding our camp are quantities of the Western Pond Turtle (*Actinemys marmorata*), large and small—tiny little fellows not bigger than a horse-bean, and stout

* 'Journal Linnæan Society,' 1863, 'Botany of North-west America.'

old males and females. They seem to have left the water all at the same time; the females are busy depositing their eggs in hollow places under the wild-sage bushes, or amidst tufts of grass; but why the little ones come on land as well, puzzles me. It is next to impossible to catch them when in the water; their habit is to come out on the edge of the pond or stream, or what they like better is to scramble up on a floating log, and enjoy the sunshine as it drifts about. The slightest noise at once sends them, hurry-scurry, to the bottom. Now I can pick them up as easily as I could hedge-snails in Devonshire; they do not even attempt to get out of the way.

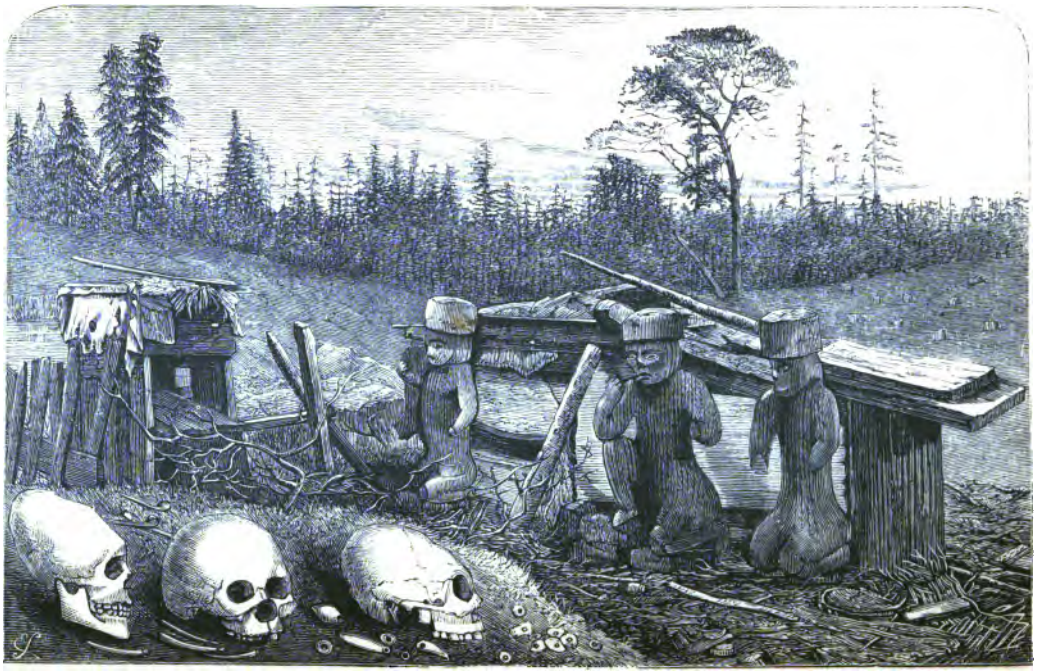
The eggs are white, and devoid of shelly covering, the contents being enclosed in a tough membrane. I discovered about fifteen in each nest, deposited in a heap, very similar to the way our British garden-snail deposits its eggs in holes in the earth. The sun hatches them, and I much regret that I could not ascertain how long a time the eggs take to hatch by the sun's heat; we had to proceed on our journey, so I was obliged, though reluctantly, to abandon this interesting investigation. The markings on the carapace are exceedingly pretty. The general colour is olive, with darker mottlings, the under-portion (or

'plastron') being a brilliant yellow. I believe this is the only species of freshwater turtle found in the waters of British Columbia; its adult size is about nine inches in length, and eight in width.

In ferreting out the turtle's eggs, I constantly disturbed the beautiful little Sage Rabbit; scarcely ten inches in length, it looks more like a rat than a rabbit, when scudding nimbly away amidst the grass. The fur is light-grey, and very like the sand and dry leaves amidst which it delights to sit. The Wasco Indians call it *Za-lak*.

I procured specimens of this rabbit at the Dalles, Cow Creek, and Colville; its favourite haunts are the narrow belts of scrub that fringe the banks of streams, hiding in crevices or among the débris at the base of a cliff, or, failing these places of concealment, makes burrows in the sandbanks; it breeds early. I obtained a doe in March, heavy with young, and am disposed to think this rabbit is only found east of the Cascades.

I found, in rambling over the sandy plain near old Fort Walla-walla, numbers of flint implements, together with heaps of fragments. At some remote period of time not easy to discover, the Indians evidently made their arrow-heads and other implements of flint at this place. The stone of which they were made could not have been



AN INDIAN BURIAL-GROUND.

Skull on the extreme left altered from circular pressure.
That on the right flattened.
In the centre retaining its normal shape.

obtained nearer than at the Cascades (previously described in vol. i.), and must have been either traded from the Indians inhabiting that district, or brought from there by themselves.

I am disposed to think a regular flint trade was carried on by these inland tribes, at some remote period. with the tribes living on the seaboard and lower parts of the Columbia. Not only were flints traded, but dentalia (tooth-shells), mother-o'pearl, and the barnacle parasitic on the back of the whale. I dug ornaments made from the three marine productions from out a gravel-bank, together with the centre skull in an Indian burial-ground (which it will be observed in the illustration* is unaltered by pressure during infancy), and a number of arrow-heads, fragments, and scrapers, made from flint, or other hard material, which must have been brought a very long distance, as it has no representative in any rock found in the immediate neighbourhood.

The place from whence I obtained these singular relics was a gravel-bank, near Fort Colville, whilst digging out the nests of sand-martins. From the way in which the various things were

* Vol. II.

scattered about, their height above the river, together with many minor matters, induces me to think the place could never have been used as a burial-ground. I merely state the fact, incidentally of considerable interest to me, as bearing on the past history of the North-western tribes.

We left Walla-walla on June 28, *en route* northward, to reach Fort Colville. I resume my journal:—

July 2.—We are on the bank of the Snake river, one of the larger tributaries to the Columbia; the river is 400 yards in width, and running like a mill-race. There had once been a ferry, in the shape of a large scow, that was worked from side to side by a truck-wheel traversing on an iron wire rope, strained across the river; but, unluckily, the rope was broken, so we had to cross by sailing and paddling the scow, and a few canoes hired from the Indians. It was a most wearisome job, as the scow had to be towed on both sides of the river, far above the landing she had to reach, in order to compensate for the swift current. Crossing occupied the entire day, but success finally crowned our exertions.

A short distance above where we are crossing I can see the mouth of the Pelouse river, a good-

sized stream. The scenery is generally wild and massive; in every direction immense walls of rocks shut in the Snake river—bare, black, and desolate; not a tree or shrub grows from amidst their craggy ledges. I am told the course of this river may be followed for days in some places, and by no possible means can its waters be reached, so that one might die from thirst although on the bank of a river.

One thing struck me as being very remarkable; up the steepish ledges of these rocky clifts were trails, beaten bare as turnpike-roads, and so numerous that they almost resembled lines on a railway-map. At first I thought goats must have made them, but on enquiry I discover the paths are used by the Indian horses that belonged to the Pelouse tribe. The mustangs scramble up these precipitous tracts, to browse on the scanty herbage that grows in the clefts and on the ledges of the rocks. The Pelouse Indians were at one time numerous, predatory, and always at war, but this once-dreaded tribe has dwindled away to a mere remnant.

Those that are left exist, rather than live, by fishing, shooting a few birds, and trapping small animals that frequent the plains and streams adjacent to their village on the Pelouse. Their

horses too have nearly all been taken from them, and the trails intersecting the hills are about the only records remaining of the herds of mustangs that once scrambled over their rocky slopes. Those of the Pelouse Indians I saw were fine athletic men for savages, but dirty, idle, and greedy to an unusual degree. Their canoes are clumsily dug out, and their lodges are made of rush and bark mats.

July 3.—We make an early start; I leave the mule-train to follow the course of the Pelouse river. The stream forces its way for many miles between vertical walls of basaltic rock; when standing on the edge of the *cañon*, I look down at the surging water, 200 feet below me, and often more; the faces of the rock-walls are quite as smooth as if some giant had hammer-dressed them. I have never seen a more grand or stranger-looking waterfall than is this of the Lower Pelouse. The trail I follow is about a quarter of a mile from the river, winding in tortuous course between immense fragments of rock, that completely hide the country to my left; ahead, a line of splintered peaks denotes the course of the river *cañon*; behind, I gaze back upon the Snake river, and the stupendous cliffs beetling over its frothy

water; to my right, a grassy slope, smooth and green as a well-kept lawn, extends for miles, until lost in the distant haze. A heavy thundering sound directs me to the cataract, which is at present hidden. I walk down the slope, and unexpectedly reach the edge of a narrow channel, about thirty feet in width and three hundred in depth.

Not a hundred yards from where I stand, the entire river plunges over a vertical face of smooth rocks; down it surges a depth of 300 feet, and possibly more, into the narrow channel into which I am looking. The singularity of this fall consists in the extremely narrow channel of basaltic rock through which the entire river is obliged to make its way before it dashes down this wondrous cliff. The river, at least a hundred feet wide on the plain, is narrowed to about thirty at the place where it falls over the rocks; hence the water leaps, if I may so express it, some distance from the rock on emerging from this natural launder, and falls vertically into the black chasm with a deafening roar like perpetual thunder.

The sun shining brightly lights up the gloomy chasm, and gives the foaming current a brilliancy unlike anything I have ever seen—an effect

heightened and intensified by contrast. I may aptly liken it, without any attempt at word-painting, to a stream of liquid silver flowing through a channel of jet. As the rays of light mingle with the spray, that hangs like a dense fog round the watery column, their prismatic colours are reflected from myriads of tiny water-drops, making fairy rainbows, that dance in mazy clusters from the base to the summit of the fall. Not a tree or shrub is anywhere visible, nothing but rock and water—a scene matchless in its immensity. I am not so much charmed with the beauty of this wild landscape, as awed and (if I may so express it) absorbed and lost in wonder; its sublime grandeur impresses me with a feeling that it is something more than earthly.

As I leave the fall, to retrace my steps to where I have tethered my horse, a large grey wolf sits eyeing me greedily. Turning from a scene that made me feel as a diatom might be supposed to feel in the jaws of a whale, to stand face to face with a large animal, that would eat me if he dared, for the moment so startled me, that I hesitated whether I should avoid my foe or fire at him; the latter inclination prevailed. Dropping on one knee, I drew a steady bead upon the wolf; and ere the crack of the rifle was lost in the

roar of the water, the beast that had presumed to intercept my path lay dead amidst the bright-green grass. The Grey Wolf (*Canis*, Var.; *Griseo albus*, Richardson) grows in North-western America, when well-fed, to a very large size; naturally cowardly, it seldom attacks man, except when driven by hunger. I met with three species in British Columbia — the one just alluded to, the Red Wolf (*C. occidentalis*), and the 'Cayote' (*C. latraus*). The Indians trap a great many wolves, their skins forming an important item in the fur-trade. One I brought home, a grey wolf, obtained at Colville (now in the British Museum collection) weighed ninety pounds, although this is not half the weight they attain on the Buffalo plains.

Found the mule-train and party encamped at the Upper Pelouse falls—very pretty, but tame and insignificant after viewing the lower cascade. Nothing of any interest, as we travel continuously over the same description of sandy treeless ground. I collected some beetles, most of them new species, described in the Appendix.

July 6.—We pass a lake called the 'Big Lake,' why I cannot imagine, as it is only about ten miles in length, and eleven in width; altitude, 2,000 feet above the sea-level. In the spring

and fall numbers of Indians resort to this lake to kill wildfowl, that rest on its waters during their migrations north and south. Swans and geese are most sought after, the following species being common:—

American Swan (*Cygnus Americanus*, Sharpless).—This handsome swan is common on all the lakes and rivers east and west of the Cascade Mountains. I saw them on the Sumass lake as late as October, the young at that time being quite brown; their breeding haunts, I imagine, are much farther north.

Trumpeter Swan (*Cygnus baccinator*, Richardson).—This magnificent bird is not nearly as often seen as the preceding. I obtained a fine specimen at Fort Rupert, and have occasionally seen it both on the Fraser and Columbia rivers; they go very far north to breed. The Indians skin the swans, and trade them with the Hudson's Bay Company, who buy them for swan's-down.

Snow Goose (*Anser hyperboreus*, Pallas).—Common east and west of the Cascades, stopping for a short time in the prairies inland, and the sand-bars along the coast, as it goes north, and on its returning after the breeding season. I obtained a fine specimen at Nainimo in October.

The Indians kill large numbers of them, and for the table they certainly excel any of the other species.

WHITE-FRONTED GOOSE, OR LAUGHING GOOSE (*Anser Gambelii*, Hartland).—I noticed this singular goose to be much more abundant on the west than it is on the eastern side of the Cascades. Immense flocks arrive, in the spring and fall of the year, on the Sumass and Chilukweyuk prairies, resting only a few days to feed; they are always in company with Hutchin's Goose. Indians kill great numbers, by making a kind of lair. They arch light sticks by fixing the ends in the ground, just high enough for a man to crawl under, and about six feet long; this they cover with grass, to resemble a mound and rushes; having crept in, the Indian lies still until a flock of geese pitch within shot; then, bowling over as many as he can, he loads again; the geese just circle round and pitch as before, and so he continues to fire until enough are slaughtered; then out he creeps, to pick up the dead and wounded.

CANADA GOOSE (*Bernicla canadensis*).—Common east and west of the Cascade Mountains; seldom seen but in pairs. In coming down from Colville to Walla-walla on our return home, in the beginning of March, I killed two Canada

geese near the Big Lake, a right-and-left shot. On opening the female, a fine fully-developed egg was discovered, the shell quite hard. I blew it, and it is now in the collection of the British Museum; that egg, I should imagine, would have been laid the next day, and must inevitably have been lost, as they breed much farther north; it is a shy, wary bird, but capital eating.

HUTCHIN'S GOOSE.—*Bernicla Hutchinsii*, Bonap. —Very abundant east and west of the Cascades and on Vancouver Island; arrives about March, going north, and returns again in September and October. Very large flocks feed on the grassy and swampy ground at the entrance to the Fraser River, and on the Sumass and Chilukweyuk prairies. It is also very plentiful in the Colville valley during the spring and fall. This goose has a most extended range. Specimens are recorded from Red River, from Hudson's Bay, from the Makenzie, from the Saskatchawan; my own from British Columbia. I also saw it in Oregon.

July 7.—It is quite delightful to find oneself again amidst trees. The Pitch pine (*Pinus ponderosa*) makes its appearance at first in scattered clumps that soon become a forest, quite devoid of underbush.

We were positively assured, that once over the Cascades, there would be no mosquitos.

If we escape the mosquitos, we are amongst enemies quite as formidable, the *Simulium* or sand-fly, and the *Tabanus* or breeze-fly. Be it known to you, ladies, that the males, or gentlemen sand-flies, brûlots of the French-Canadian trappers, are not blood-suckers, but live on flowers and sip the honey in indolent enjoyment; what should have been the gentler sex are like Dahomean Amazons, the sanguinary spirits of the tribe. In size, the sand-fly is not nearly so large as the mosquito, and, instead of being a slim, genteel blonde Madame Brûlot, is as black as a Guinea negress—her body is short and dumpy, her gauzy wings when folded nearly twice the length of the lady herself, and her legs somewhat long and slender. Her mouth is not a loveable one, being a bundle of fearful lancets, the sheath of which forms a tube through which the blood is sucked after the barbed stilettoes have done their work: an icorous fluid is in all probability instilled with the puncture, hence the intense irritation arising from the wound.

Where the sand-fly lays her eggs is not, I believe, very well known, but it is more than likely that they are deposited on the stems of aquatic

plants, for the larva is easily discovered holding on to them a little below the surface of the water. He is a long, round, ugly-looking grub, divided into twelve segments or rings. The second pair of feet are prehensile, and used for holding on by. He is rather active when undisturbed, but the slightest touch and he hangs by the feet, exactly resembling then a bit of dead rush. When the larva has attained its full growth, it spins a small delicately-fine silken bag, in which it changes to the pupa state; this bag is invariably left open at the top, and, being spun the long way of the stalk to which it is affixed, the pupa is in an upright position, and the head of the pupa protrudes a little way out of the bag. Four hair-like filaments, like horns, project from the head of the pupa, and are supposed to be breathing organs. About the end of June the delicate little fly bursts from its sarcophagus, and prepares for an aerial existence; and a contrivance utterly different from the mosquito boat, yet equally beautiful and effective, aids the newly-liberated captive to escape being drowned. Maturity attained, the pupa-case splits down the back, and the end of the silken bag being open, out creeps the fly, not into the water, but into a minute silken balloon, a part of the pupa-case, or, I imagine, the

lining of it. Loose from its moorings, steadily the balloon ascends through the water with its living freight. On reaching the surface, the fly breaks through its slender walls, spreads its wings, and with a hum of delight, away goes Brûlot to revel in the sunshine amidst the leaves and flowers. I may as well describe this day's journey, the misery of which I shall never forget.

Flowers in wild profusion peep up in myriads from among the green bunch-grass; the birds are busy in every tree and bush—some building nests, others feeding their little ones. The air, heavily laden with perfume, seems too idle to move; and the great striped humble-bees, as they tumble from flower to flower, buzz a drowsy song of satisfaction. Very enjoyable but for the clouds of sand-flies that the mules and horses composing our pack-train stir up from the grass at every step, and, as if the flies have been accustomed to regale themselves daily on the blood of man and beast, at once cover the animals so thickly that they look almost black. Kicking, plunging, and even rolling on the grass avails not, to rid the tortured beasts from their assailants. Unlike the bite of a mosquito, that left only an irritable lump, blood flows from every puncture made by the terrible lancets. They waltz round my head like a

swarm of bees, and but for a net veil I luckily have with me, my face would be savagely attacked and my skin rapidly converted into a kind of wire gauze. I pick, as do each of the packers accompanying me, large bunches of leafy twigs, and whirling them round and round, strive, though vainly, to sweep the vexatious intruders away. My heart is really grieved to see the poor suffering animals—obliged, spite of every effort of tail, legs, and ears, to bear the torture without even the proverbial relief of a 'grin.' One good little mule, we call him Johnson (that being the name of his late master), grows fagged, as mules very frequently do, and when in that condition neither force nor persuasion is of the slightest use to induce them to 'move on:' all you can do is to unpack and distribute the load amongst the other mules, leaving the tired animal on the trail. After camping and supper over, a packer rides back after the missing mule, and usually has no difficulty in bringing him into camp. Poor Johnson is unpacked and left on the trail, and as we camp very soon after leaving him, two packers at once go in pursuit. Short, however, as the time and distance are, it is with immense trouble they slowly get him into camp. Such a pitiable sight as the poor beast

presents I never beheld, covered literally and truly from head to heel with sand-flies. Each of these little harpies looks pink. Their skins, stretched to a state of transparency, reveals the colour of the fluid they are gorged with. You would not know that it was a mule if you stumbled by accident on it, so fearfully is poor Johnson swollen from the poisoned punctures. We did all we could to relieve his sufferings, lit a fire, and smoked off the flies, washed and greased him, but all to no purpose. About two hours after he was brought in, he died. Who would have dreamed such pigmies could kill a powerful mule in two or three hours!

The only plan of protecting yourself and your animals is to light large smouldering fires so as to produce voluminous clouds of smoke. This the brûlots are unable to stand; the poor animals know it, and crowd round the smoking embers, hustling one another in their anxiety to be the nearest. The Indians all adopt this method, and wherever Indian horses are grazing in summer time, immense fallen trees that are sufficiently dry to burn are lighted from end to end, and round these all day long the horses crowd. At night the sand-flies give but little trouble, and, like sensible insects, take a few hours' repose. Most appro-

priately were they named 'burning flies,' for, wherever they thrust in the lancet, it is just as though a brad-awl needle had been bored slowly into one's flesh. They continue the summer through until September, but luckily are confined to particular districts. Sandy soil, and lots of water, are the essential elements conducive to their welfare and multiplication. Bad as these burning flies are, I still maintain Madam Mosquito is far the worst. The Ladies Brûlot do indulge in a short repose, but Mistress Mosquito, I believe, never winks her eyes, and is always on the move.

By *Breeze-fly* I mean flies belonging to the genus *Tabanus*, not those of the genus *Œstrus*, with which they are frequently confounded. The latter—commonly called Bot-fly, which is also a terrible pest, alike avoided by both horse and ruminant—deposits its eggs sometimes on the hair, and sometimes underneath the skin; hence animals, guided by a natural instinct, or having been the victims of a past and painful experience, all at the sound of his dreaded trumpet make the best of their way to the nearest water, into which they plunge.

On the contrary, in the Breeze-fly we have to do with a veritable *blood-sucker*, more ravenous

than would be any winged leech. There are three species, all three by far too plentiful for the comfort of either man or beast, and widely distributed in North-west America. These insects have an apparent ubiquity, and are literally everywhere. Ascend to the regions of eternal snow, there are hungry Breeze-flies awaiting one's arrival; by the rushing torrent, on the shores of the placid lake, under the deep damp shadows of the pine-trees, or on the open flower-decked prairie, there are sure to be Breeze-flies. One barely hears the sound of its 'clarion shrill' and hum of the rapidly-vibrating wings, ere one feels a sharp prick, as though a red-hot needle had been thrust into the flesh; stab follows stab in quick succession, and unless active measures of defence be resorted to, the skin speedily assumes the form of a sieve.

The horses and mules give immediate notice of the enemy by viciously throwing up their heads and heels, snorting, and, very possibly, indeed I may say generally, summarily discharging their loads, be they human or baggage, over their heads. Whether success attends this disagreeable habit or not, in any case a hasty retreat is made for the nearest water, where both man and beast well know the Breeze-fly seldom or never follows.

I have frequently seen a train of pack-mules completely scattered by these formidable pests.

The largest and fiercest is the Black Breeze-fly (*Tabanus atratus*). His body is like glossy black velvet, frosted over with a delicate white bloom, like a freshly-gathered Orleans plum; it is about an inch in length; the wings, like pale blue gauze, when at rest are always kept in a horizontal position; the alulets are large and strong. The eyes are exquisitely beautiful, in colour dark-blue, but glittering with the lustre of highly-polished gems, and nearly covering the entire head.

The next in size is the Belted Breeze-fly (*Tabanus cinctus*), about one-third smaller than his sable brother. He is clad in bright orange livery, banded with stripes almost black; and has a most showy appearance, being decidedly the best dressed fly of the family. The eyes are emerald green, and, when viewed in the bright sunlight, have the appearance of being cut into numerous facets.

The third or smallest is the Lined Breeze-fly (*Tabanus lineatus*), of a bluish colour, and marked only with a white line along the top of the head. In this fly the eyes are of bluish-green, and uuite as beautiful as in the two preceding.

The Lady Breeze-fly, I am grieved to say, is far more to be dreaded than her lord. These insects can never, one would suppose, enjoy the luxury and delight, or whatever may be the proper term applicable to such a universal habit as kissing. How could a winged lady, I should like to know, be kissed by a winged wooer when her lips are a bundle of lancets, six in number, and as sharp as a surgeon's? True the male has four blade-like instruments arming the mouth, but it is questionable whether he uses them for other purposes than that of sucking nectar from flowers. The apparatus of the female is beautifully adapted for puncturing the skin and then pumping up the fluid through the sheath of the lancets, that acts as a tube or canula. It would be of trifling interest to advert more in detail to the minute anatomy of these insects; that can be better learned from works on structural entomology; the habits of the insect in far-away lands, sketched from personal gleanings, being more strictly my province. The rambler alone has an opportunity to investigate the haunts and watch the habits of strange beasts, birds, and insects; to the anatomist, at home in cosy closet, belongs the task of developing, with scalpel and microscope, the complicated

machinery by which life's varied duties are carried on.

The larva lives in the earth, a grub easily dug up in the moist prairie lands; of an elongated sub-cylindrical form, tapering off towards each extremity; its colour a dingy yellow; destitute of feet; having a body divided into twelve segments, each segment being banded with a row of minute horny hooks — an admirable contrivance, enabling it to drag itself along through the earth. The head is horny, and brownish-yellow in colour, also armed with hooks to aid in progression. The pupa I have never seen, but De Geer tells us the pupa of *Tabanus bovinus* is 'naked, incomplete, elongated, sub-cylindrical, with six spines at the end of the body, the margins of the abdominal segments ciliated, and the forehead bi-tubercled.'

Where or when the eggs of the *Tabanidæ* are deposited is not generally known, but it is more than probable on the stems of plants, to which they are fastened by a glutinous secretion; the grub, when hatched, falling on the ground, at once buries itself. Neither is it known how long a time the larva remains in the earth ere it changes to the pupa form.

I remember once being busily occupied all

day collecting beetles and other insects in the dense, shady pine forests, close to a small stream called the Selecé, that flows down the western slope of the Cascade mountains: boxes, bottles, bags, even my hat, indeed every available locality about my person was appropriated to the stowage and transport of the proceeds of my hunt. My mustang had been tethered close to the water, and had thus kept clear of the Breeze-flies during my absence; soon, however, after mounting him to return, emerging from the forest, I came on a small patch of open prairie land, but no sooner was I clear of the timber than the pests were at us. My beast commenced practising every species of jump and leap that it was possible for a horse to execute, and several of them of a nature so extraordinary that one would have thought no animal that ever went on four legs could accomplish; he pranced, shied, kicked, leaped forward, backward, sideways—in a word, performed such demoniacal pranks, that, although a practised horseman, I found it a most difficult matter to keep my seat. As a finale, off he went like a mad creature, caring nothing for all my efforts to stop him: then, as if from sheer madness caused by the punctures of the flies, that followed like a swarm of enraged bees, he stopped suddenly short,

viciously threw his head between his forelegs, and at the same time elevated his hind ones into the air; the whole being performed with such sudden and savage violence that I was pitched clean out of the saddle: boxes, bottles, bags, together with all my insect treasures, lay scattered over the prairie, and ere I could regain my feet I had the satisfaction of seeing him put his legs into the bridle-reins, drag it clean off his head, and, with a snort that sounded mightily like a derisive horse laugh, he galloped off, leaving me to my own devices. I mention this little adventure to show how terribly these pests can madden an animal.

From an intimacy by no means sought, or on my part cultivated, with the *Tabanidæ*, or Breeze-flies, I am disposed to think the fly called *Zimb*, and described by Bruce, belonged to this family, and was not an *Œstrus*, as many have supposed. Speaking of the *Zimb*, in reference to the camel and elephant: 'When the first of these animals are attacked, its body, head, and legs break out into large bosses, which swell, burst and putrefy, to its certain destruction.' Just such effects have I again and again seen amongst horses and mules. One mule we had to abandon on the prairie (a disabled foot preventing its travelling any farther)

was, when we returned for it, so stung by the Breeze-flies as to be one mass of small ichorous ulcers from head to hoofs; so pitiable was the poor beast's plight, its injured limb having precluded all chance of escape from the flies, that, as a mere matter of humanity, it was at once shot. I have also frequently seen tethered horses so injured by the punctures of the Breeze-fly as to be rendered useless for many months. Their favourite places for puncturing are on the front of the chest—where the saddle goes,—and inside the thighs. If a man were tied or otherwise disabled, so that all chance of beating off or escaping from the Breeze-fly was out of his power, I have no hesitation in asserting my firm conviction that they would rapidly kill him.

The Belted Breeze-fly is most abundant, a lady charmingly dressed in orange flounced with black, very attractive when you see her sunning herself amid the petals of some prairie flower, but a closer acquaintance destroys the charm, as she soon lets you feel her power of wounding.

Travelling in Oregon one constantly finds one's-self on the banks of a wide glassy lake; gazing over its unrippled surface, the eye suddenly rests on what, to the inexperienced in hunter's craft, appears to be small clumps of twisted branches,

or dead and leafless tree-tops, the trunks of which are hidden in the water; but the Indian and 'trapper' discerns in a second that the apparent branches are the antlers of a herd of Wapiti that have been driven into the water by Breeze-flies. Wild cattle seek a like means of protecting themselves against such terrible foes: a perfect forest of horns may frequently be witnessed in a pool, but not a vestige of the bullocks, save their noses, kept above water for the purpose of breathing.

For the first time I notice that singular bird CLARK'S CROW, *Picicorvus Columbianus* (Bon.), hopping busily from branch to branch amidst the pine trees.

Wilson, in his 'American Ornithology,' in giving a brief notice of this bird, says: 'It is remarkable for its formidable claws, which approach to those of the *Falco* genus, and would seem to intimate that its food consists of living animals, for whose destruction these *weapons* must be *necessary*. It inhabits the shores of the Columbia, frequenting the rivers and sea-shore, probably feeding on fish.' There never could have been a greater mistake; the bird never frequents the river banks, never by any chance eats fish, and would no more attempt the capture of other living things than would a turtle-dove or a canary-bird.

Its habits are strictly arboreal, its food the seeds of the pine-trees. Watching a flock of these busy, noisy seed-hunters, one notices at a glance how curiously they hang on to the cones; and five minutes' observation tells you what the claws, so falcon-like in appearance, are for better than a month's guessing.

Clark's 'crows' have, like the cross-bills, to get out the seeds from underneath the scaly coverings constituting the outward side of a fir cone; nature has not given them crossed-mandibles to lever open the scales, but instead, feet and claws that serve the purpose of hands, and a powerful bill, like a small crowbar. To use the crowbar to advantage, the cone needs steadying, or it would snap at the stem and fall; to accomplish this, one foot clasps it, and the powerful claws hold it firmly, whilst the other foot, encircling the branch, supports the bird, either back downward, head downward, on its side, or upright like a woodpecker, the long grasping claws being equal to any emergency: the cone thus fixed and a firm hold maintained on the branch, the seeds are gouged out from under the scales. I have now a large packet of seeds, some of which have been grown (the seeds of *Abies Douglassii*), that I cut from the crops of 'Clark's Crows;' indeed it is next to

impossible to obtain the seeds of some of the very tall pines in any other way, a cruel system of collecting I should ever discountenance, if the poor birds were sacrificed merely with the hope of obtaining seeds from their crops. Those killed were for specimens to bring home. A few winter in British Columbia, but the larger proportion go southward in September. On their arrival in May, or early in June, they assemble in immense flocks, and so terribly loud is the noise they make, that you can hardly hear the sound of your own or others' voice; a most discordant, continuous, grating clatter, intensified at times into a perfect shriek. These assemblies only last about a week, during which time the wooing is done, and marriages celebrated, the favoured birds getting such fair ones as they choose, the less fortunate such as they can.

The pairs then depart, to perform the all-important duties of nesting. The nest I saw (I never succeeded in finding more than one) was in the top of a lofty pine-tree, at least 200 feet high; the tree was felled in cutting the Boundary line, and by chance I discovered the nest. The eggs were of course smashed to atoms, but the old birds hovered round and even perched on the ruins of their nursery, leaving no

doubt about its being the nest of 'Clark's Crow.'

The nest was very large, and composed of fir-twigs, bits of bark, the bracts or leaves of the pine, and fine root-fibres; some small pieces of moss and grey lichen were mixed carelessly with the other materials. The shape was difficult to make out, as the crash of the falling tree had damaged it considerably; but I should say it was shallow, round, and presenting a large extent of surface beyond the margins of the hollow containing the eggs. The remains of about four eggs were, I should think, scattered round, the fragments much like the eggs of Steller's Jay in colour, but of a lighter shade of bluish-green. From the fact of my never by any chance finding a nest low down, I imagine their habit is always to build in the very tallest pines. West of the Cascades I believe it is unknown, that ridge of mountains being its boundary northward. Its size is about that of a pigeon; length 12 inches, wing $7\frac{1}{4}$, tail $4\frac{1}{2}$, tarsus $1\frac{1}{2}$. Colour, bluish-ash, lighter on the forehead and round the eyes. Wings nearly black, with a shade of green overspreading it. Secondaries and tertials (except the innermost) tipped broadly with white; tail white, the inner webs of the fifth and the whole

of the sixth feather black. Tail-coverts same colour as wings.

July 8.—After crossing a very high ridge we look suddenly down into the valley of the Spokan river. The river has a very rapid flow, and where we ferry it, in a scow worked by a rope from side to side, it is about 150 yards wide. The charge for crossing was, I think, a dollar (4*s.*) per head for packed mules; the cattle swam it.

We camp on a grassy flat, known as Walker's Prairie, a few miles from the ferry, where a solitary settler keeps a rough kind of inn. I wander across the prairie, and am amused with the freaks of the ground-squirrels (*Spermophilus Parryi*, Richardson); they live in burrows dug in all directions into mounds, which mounds, I think, are not made by the squirrels. By keeping still I soon saw numbers of them emerge from their holes, chase one another round the hillock, up one side, down the other, as if they were occupied in playing some game fashionable in squirreldom. If I move or otherwise make my presence known, shrill whistles oft repeated warn the assemblage that danger is at hand; each at once makes for its hole and disappears. In coming from out their burrows, their habit is to sit upon their haunches at the entrance, and with their tiny

forefeet brush the whiskers, ears, eyes, and head in general, I suppose, to remove particles of dirt accumulated in passing through the tunnel.

It is curious to note how three species of ground-squirrels have replaced each other in accordance with the change of vegetation in our transit from the Dalles to where we are now encamped.

At the Dalles we saw *Spermophilus Douglassii*, the Columbia Ground Squirrel (described in vol. i.), extending only as far as the scrub-oak grew, the Fall river being its boundary going north towards Colville.

Betwixt the Fall river and the Spokan, inhabiting the sandy and woodless plains, Richardson's Ground Squirrel (*S. Richardsonii*, Cuv.) is alone found. After crossing the Spokan and getting into the timbered regions, the ground-squirrel I have been looking at takes its place, and extends from the Spokan to the slopes of the Rocky Mountains.

July 9.—To-day we have a charming drive through grass and open timbered land, like a succession of beautiful parks. Cross several small streams, icy cold, but clear as crystal. By these rivulets I noticed Parkman's Wren (*Troglodytes Parkmannii*, Aud.).

It is difficult to watch its movements, so diminutive is it in size, and yet so quick withal. The mellow song of the wrens seems almost like fairy music; and sounds so delicately sweet appear to be out of place amidst such giant trees.

The nest is in shape like that of our household pets, built against a dead stump, or in the deep clefts in the bark of a pine-tree which are often taken advantage of, to act as lateral walls. Its skill in imitating the colour and appearance of the bark is perfectly wonderful: even when one has watched the bird go in, it is most difficult to make out that it is a nest and not real bark; take the eye off the spot but an instant, and goodbye to finding the nest again, except the birds go in and out. They build in June, six or seven eggs being generally laid, and arrive about the middle of May, leaving in September, young and old together.

Nuthatches were busy in nearly every pine-tree, with their constant companions the restless tits. The three species common in the forests east of the Cascades are:—

The Slender-bill Nuthatch (*Sitta aculeata*, Cassin).—This nuthatch is very abundant in the pine-forests from the coast to the Rocky

Mountains; never seen in large flocks, but usually alone, or in twos and threes. Remained about Colville during the winter, when the temperature was 30° below zero. Nests in holes in the branches of the tallest pine-trees, so high as to render getting the eggs almost an impossibility. They nest early in June.

RED-BELLIED NUTHATCH (*Sitta canadensis*, Linn.).—Very common on Vancouver Island and on the Sumass prairies, but rather a rare bird between the Cascades and Rocky Mountains. I have seldom seen more than one or two together, and then generally in dark swampy places. Nests in holes in dead trees; eggs laid on the dust made in working out the hole.

CALIFORNIA NUTHATCH. (*Sitta pygmæa*, Vigors).—An abundant little bird along the entire length of the Boundary-line from the coast to the Rocky Mountains, also common on Vancouver Island: you always see these little fellows in large flocks in company with the Chickadees, except during the nesting-time, which is in June. A few remain about Colville during the winter, but the greater portion leave in November.

These most active birds are always on the move; after nesting-time they congregate in large flocks, and, rejoining their companions the

tits and golden-crests, fly on without any apparent care as to direction—constantly flitting from tree to tree, twittering a low sweet note, as if singing to themselves—sometimes climbing back downwards along the under-sides of the topmost branches of the tall pines, peering into every crevice for insect-hiders; at others, descending to the ground, they cling to the slender flower-stalks to catch drowsy insects, sipping the sweets stored in these perfumed drinking-places.

They nest in June, making a hole in the dead branch of a pine-tree; there is no lining in the hole, but the eggs are laid on the dust made in enlarging or boring it. Eggs in British Museum collection from Colville. They range northward to Fort Simpson, and southward through Oregon and California. This applies to all three species.

The following four species represent the Tits:—

Western Titmouse (*Parus occidentalis*, Baird).—Common on Vancouver Island and along the whole course of the Boundary line to the summit of the Rocky Mountains. A few remain during the winter at Colville, but the greater portion leave in November and arrive again in April; they nest in June, choosing a hole in a dead tree; line the nest with grass and

feathers; after the nesting-time they assemble in large flocks, and feed in company with the Mountain Tit and the Golden-crested Wrens, then keep together until they take their departure south.

MOUNTAIN TITMOUSE (*Parus montanus*, Gambel).—This bird has just the same range and distribution as the preceding, and agrees with it in habit, periods of migration, and nesting time, but it is not nearly so plentiful.

CHESTNUT-BACKED TITMOUSE (*Parus rufescens*, Townsend).—This little fellow is very abundant on the Sumass prairies, and along the Fraser river, but rare between the Cascades and Rocky Mountains. I met with it at Colville, in company with a flock of Golden-crested Wrens, and once at Syniakwateen; hence I am disposed to think it is more common along the coast-line than in the interior. It arrives in May, and leaves again in September. I never found its nest. The northern range of these tits is about lat. 53° N., and south through Oregon and California.

LEAST TIT (*Psaltriparus minimus*, Bonap.).—I saw this tiny tit but twice, at Sumass prairie and on the Nesqually plains, but had no opportunities to observe its habits. I expect it is more plentiful than one would imagine; its

small size, and habit of hiding in thick brush, renders it extremely difficult to find.

We camp at a place called 'Dead Man's Prairie.' Three roughly-made crosses denote the graves of three men, who (so the story goes) lost their way on this prairie, and having no provisions, dug roots to live on; but not knowing the edible from the poisonous varieties, ate some bulbs that killed all three of them; their bodies were discovered and buried, and the place has been named Dead Man's Prairie ever since.

From this not very cheering spot we follow up the Colville valley, pass by some very good farms, where excellent grain and vegetables are grown; and on the 12th reach our destination, Fort Colville, already described in vol. i., in the chapter on Salmon Fishing at the Kettle Falls (page 71).

CHAPTER VII.

THE COLVILLE VALLEY OUR HEADQUARTERS—THE WHITE-BELLIED SWALLOW — CLIFF SWALLOW — BANK SWALLOW — ROUGH-WINGED SWALLOW—BARN SWALLOW AND ITS STRANGE NESTING-PLACE — VIOLET-GREEN SWALLOW — WESTERN MEADOW LARK — TOWNSEND'S FLYCATCHER — AMERICAN RAVENS — BULLOCK'S ORIOLE—BREWER'S BLACKBIRD OR WESTERN GRACKLE OR CANADA VAY—WHISKY JACK—LESSER REDPOLE — THE LAZULI FINCH — OREGON GROUND ROBIN—GREY-CROWNED FINCH.

THE United States Boundary Commission were stationed about eighteen miles from the Hudson's Bay Company's fort. It would be of little interest to recount the building of our log-quarters, stowing provisions, and completing all the requisite arrangements for the coming winter. It will suffice to say, all was satisfactorily arranged, and ample provision made for the commissariat of both men and animals.

Colville valley, in which we erected our headquarters, does not belong to British Columbia, but is in American territory. There was no

other place north of the Boundary line, as it passes the Columbia, so well suited for the purposes of the Commission as this valley—hence the Commissioner fixed on it as our headquarters. It was a glorious place for birds: which were in great force. All my notes on the habits of the different species of birds I observed, shot, and brought home, would fill a ponderous volume; the full list of species is given in the Appendix. For special description a few groups are selected, whose habits are not generally known, or which vary in accordance with local modifying causes—matters always interesting to the general reader as well as to the naturalist. Swallows are always in great abundance, arriving from southward when the insects make their appearance.

The White-bellied Swallow (*Hirundo bicolor*, Vieillot) is one of the most abundant species visiting Vancouver Island and British Columbia, reaching an altitude, on the Cascades and Rocky Mountains, of 7,000 feet above the sea-level. Its favourite hawking-grounds are the open prairies, or round the margin and over the surfaces of lakes, large and small.

Unlike the species next described, this swallow always builds its nest in dead willow or cotton-wood trees, and lines it with ducks' feathers.

I am quite sure these swallows dig a hole in the solid tree, a feat their soft beaks appear hardly fitted for, inasmuch as I saw one begun and finished at the Sumass prairie, where great numbers of swallows annually resort to build, finding there an abundance of the favourite soft willow-wood.

CLIFF SWALLOW (*Hirundo lunifrons*, Say). —I never saw this bird on the west side of the Cascades, but it is very abundant between the Cascades and Rocky Mountains. Arrives at Colville in May and June, in immense flocks. On arriving they at once fix on some steep rock with an exposed surface; days and days are spent in whirling round and round this intended building-site, chattering, and clearly having warm and angry debates, about the summer labour; they at last adjust all preliminary arrangements, then set to work in earnest.

Cliff-swallows are the most sociable of birds, and work together in hundreds, side by side, on very amicable terms. The nests are made of mud; in shape like a retort, with long narrow neck like a chimney, which the birds creep through to reach the globular nest; this neck is artfully bent, to prevent the eggs or young from falling out. A form of nest clearly designed to prevent the ac-

cess of wet, and act as a safeguard against the depredations of birds of prey, a highly necessary precaution; the nest, placed on a bare surface of rock, unsheltered by even a leaf, is visible to every passing plunderer; and further, its form shades the sitting bird from the intense heat of the sun.

Frequently fifteen or twenty nests are piled on one another, their long tubular mud entrances sticking out in all directions. It is a pretty sight in a houseless country to watch these feathered masons, always suggestive of home, and the familiar martin, that builds its mud-nurseries under the eaves of our residences, recalling sad though pleasant memories of friends far away, perhaps, like I am, watching the mason-birds.

After nesting-time they abandon the rock with their families, and scatter over the prairies, reassembling, prior to their final start for the south, in September; the nesting-time is in June, five eggs being usually the number laid.

BANK SWALLOW (*Cotyle riparia*, Boir).—These arrive at Colville in May and June, but somewhat earlier along the coast and at Vancouver Island. They are widely distributed, and generally frequent the larger river-banks. On their first arrival they assemble in immense numbers, sometimes so completely covering a dead

tree as to stand on one another for lack of room; then they pair, and make their nests in sand-banks, digging about fifteen or twenty inches in; line the hole with grass and the fronds of the pine-tree. They leave again in September. Lay four or five eggs.

ROUGH-WINGED SWALLOW (*Cotyle serripennis*, Bonap.).—This swallow arrives about the same time as the sand-martin, and has much the same habits and distribution, but differs in its choice of nesting-place. Like the woodpecker, this bird either makes a hole in a dead pine-tree, or, taking possession of one already made therein, builds a nest of feathers and deer-hairs, lays four or five eggs, and fetches out its brood in July. The eggs are most difficult to obtain, the trees selected for nesting being usually too rotten to climb.

BARN SWALLOWS (*Hirundo horreorum*, Barton) are common on Vancouver Island, and on both sides of the Cascade Mountains. They arrive at Colville in May and June, and build either under a ledge of rock, or in an old out-building, if such can be found.

Whilst at our depôt at Syniakwateen (vide illustration in Volume I.) a solitary pair of barn-swallows paid us a visit. A small shanty

stood a short distance from the log-huts, loosely built with poles, and shingled over to keep out the rain, in which our two blacksmiths were always at work. Early on a summer morning, towards the end of June, my attention was directed to two barn-swallows perched on the roof of the little shed. They did not exhibit the slightest fear or alarm, although the bellows snorted and wheezed, and sent myriads of brilliant sparks from the crackling charcoal dancing into the air; whilst the hammer, plied by a lusty arm, rang a merry peal as it smote the ruddy iron. Presently off they flew, and circling round entered the house, and carefully examined the poles supporting the roof. Perching on them here and there, they felt the surface with their beaks, then twittered in the most excited manner to each other. This system of selecting a site was repeated several times, until the question was evidently settled and decided upon.

The following day the foundation-stone was laid, a tiny bit of mud being affixed to the beam just over the anvil; and although the hammer constantly passed close to the birds and their building, still they went steadily on with their work. In about three days the nest began to

assume a rough outline of what its form was eventually to be; its shape, when completed, being very like the half of a teacup stuck against a wall. Being curious to see from whence they procured their building materials, I tracked them to the edge of the stream, where, on a tiny kind of beach, they worked up the clay and fine sand into mortar with their delicate beaks. For days these feathered architects, with unwearying patience, journeyed to and from the brick-field, making their own bricks, carrying them home, and carefully laying them.

The house is built; and next to furnish it. First of all, minute bits of soft dry grass were brought, and laid on the bottom, and round the rough walls; this occupied about two days; then excursions had to be made along the banks of the stream, where ducks' feathers and bits of goose-down were picked up, brought home, and neatly deposited on the grass lining, until the inside was made as smooth and soft as an eider-down pillow. The trustful couple knew no fear. I frequently stood on a log to watch them, their feathers touching my face as they toiled at their brickwork—twisting, shaping, fitting, and gluing the bricks together with an adhesive salivary secretion.

Three days after the work was completed, the first egg was laid, and then one on every second day, until five were in the nest, and the process of incubation commenced. As far as I could observe, the eggs were never uncovered. The hen-bird sat by far the greater part of the time, but, on her leaving the nest to feed, the male invariably took her place. In time, five infant swallows—that, to perpetrate a pun, were veritably *all swallow*—gaped greedily for food. Hard the couple toiled, to feed their hungry family. As the little ones grew and thrived, their residence was too small to hold them; a daring spirit came with their feathers, and, becoming strong, they made rash attempts to scramble out on the edge of the nest, and there, in the most unsteady manner, to balance themselves until angrily knocked in again on the return of the old birds.

At last they abandoned their nursery, and three succeeded in getting upon the pole to which the nest was attached, and two fell on the floor; and what might have been their fate I do not know, if the old Vulcans had not picked them up and placed them with their brethren. A few days' training taught the fledglings the use of their wings; then taking their departure from the shanty, the family started to brave the perils of

the world. Where white man's foot had never trodden before—in the solitude of a primeval forest, in a rough shanty formed by human hands, where the roaring bellows and clanging hammer kept chorus all day long—there two swallows, trusting that man would harm them not, erected their mansion, watched and reared their children. Where they would have built their house had not man's handiwork provided them with a site, I hardly know. I never but once again saw this swallow's nest, and this was built under a bridge we made across a small stream. I suppose they must find old caverns or holes in the rocks, for, being an open nest, it must be sheltered from the rain.

VIOLET-GREEN SWALLOW (*Hirundo Thallassina*, Swainson). — This beautiful swallow is common from the coast, along the entire course of the Boundary-line, to the summit of the Rocky Mountains. They are amongst the earliest visitors at Colville, arriving in small flocks in March, but in greater numbers in May and June. They build in June, making their nests in holes in dead trees, as high as they can get, and lay four or five eggs. The nest is made of feathers and soft hair. I am pretty sure their nesting-holes are excavated in the soft wood by

themselves; although their soft purple beak appears ill-adapted to perform such labour, although the wood, being soft from decay, easily crumbles. They assemble in large flocks before migrating in September.

WESTERN MEADOW LARK (*Sturnella neglecta*, Aud.).—After being shut up, and closely imprisoned by the bitter cold and deep snows of a North-western winter, one hails with delight the first heralds, announcing the prospect of speedy relief—sunshine and summer. The meadow-larks (or starlings, more correctly) are amongst the earliest arrivals, making their appearance in the interior of British Columbia, before the snow has begun to thaw even from the roofs of the log-huts.

Their custom, on first arriving, is to sit on the extreme tops of the sprays that project above the snow. The brilliant golden-yellow, decking their breasts, and the rich browns on the back and wings, are in such vivid contrast with the intense white on every side, that one is almost tempted to imagine some magi's hand had conjured gorgeous blossoms on the leafless sticks; until the mellow plaintive songs, pealing over the wintry waste, tells you that life is there, with hope and confidence in coming events. Leaves, flowers, grass, insects, all are missing, still the

birds know they are sure to come; their instincts are true, and so they patiently await the change from bleak winter to genial spring, as joyous as if they had not quitted the sunny south.

The nest is made, in a very careless manner, on the open prairie: a hollow is selected (the foot-print of a deer generally), in a sloping bank or knoll, and filled with dry grass-stalks, not woven together but laid one on another, like hens' nests are made with straw; sometimes, though not invariably, a few hairs are laid on the grass-stalks, but with no attempt at definite arrangement. Five or six eggs are laid early in June; after nesting, young and old flock together, until their departure in September. They are generally distributed throughout British Columbia, extending north to Sitka, and farther for aught I know; they are plentiful also on Vancouver Island, and on all the islands in the Gulf of Georgia.

Townsend's Flycatcher (*Myiadestes Townsendii*, Cabanis).—I met with these rare birds once only, and then at Colville. It was towards the end of November; deep snow was on the ground, all the leaves had fallen, and the cold was intense. My attention was first attracted by hearing a low sweet song, not unlike that of our English song-thrush, which at this time of year was a most

unusual sound. On looking round, I saw about twenty of these birds perched on the top sprays of some white-thorn bushes. In their mode of darting off and returning again to the spray, they put me in mind of the shrike. I shot six of them, and could detect no material difference in plumage between males and females; in the stomachs of those I opened were the remains of some small coleopterous insects and a few haws. They left the next day, and I never saw them again.

American Ravens (*Corvus carnivorus*, Bartram).—Ravens are distributed all over North-western America, in every part of British Columbia, from the Rocky Mountains to the sea-coast—on Vancouver Island, and all the others in the Gulf of Georgia. In the forests by the rivers and lakes, on the prairies or in the swamps, ravens are always in waiting, to demolish anything they can find dead, or to slay the weak and helpless. Their migration is simply from the inland, during winter, to the seacoast. A dozen or two remained at our headquarters at Colville during the winter, contrary to their habits—induced to linger in order to feed on the offal from our slaughtering-yard. In summer they are habitually shy, and very watchful against any chance

of surprise; but deep snow, and a temperature 32° below zero, so tamed them, that they came down on the bullocks as the men were skinning them, and, though again and again knocked off, refused to leave until they had a bit given them: luckily for the ravens, the men had a superstitious dread of doing them an injury, so that they had only to fight it out with the dogs and Indian women, as to right of offals.

The nest is built of sticks, and placed on the very summit of the tallest pine-trees they can find. They build very early in May, and usually have two broods in the year. The same pair of ravens use their old nest, simply repairing the damage done by wind and weather. I have seen them so gorged with dead mules' flesh as to be unable to fly into a tree; flapping their wings, to aid in hopping the faster, they scrambled into the bushes in a most undignified manner, too full even to croak. They seldom lay more than two eggs.

BULLOCK'S ORIOLE (*Icterus bullockii*, Bonap.).—This is the only representative of the orioles in British Columbia, and by no means abundant, or often seen by visitors. These birds prefer the localities where the scrub-oak grows to the pine region, and build a long pendulous nest, beautifully woven of fibrous roots and grass-stalks,

suspending it from the point of an oak-branch, without any attempt whatever at concealment. The nest may frequently be seen dangling like a jelly-bag drying. I have previously given an account of a tree covered with their nests which I saw on the Shasta plains. From five to six eggs are laid in June. I have never seen the oriole north of the Fraser river, and but rarely east of the Cascades. A few stragglers visited our quarters in the Colville valley, which arrived late in May and left early in September, the males usually preceding the females by three or four days.

BREWER'S BLACKBIRD, OR WESTERN GRACKLE (*Scolecophagus cyanocephalus*, Cuvier).—A rare bird, I should say, in British Columbia. I have seen a few at Vancouver Island, in the yards where cattle are fed, and a small number frequented our mule-camp on the Sumass prairie. East of the Cascades I saw them only at Colville, where a small flock wintered in a settler's cow-yard. They appear to have a great liking to be near animals, arising, I presume, from their finding more food and insects there than elsewhere. They walk between the bullocks' legs, perch on their backs, deftly turning over the hair in search of parasitic pests, which they nip with their forcep-

like beaks, much to the tough-skinned ruminant's delight.

It was pleasant to watch an old ox with three or four of the blackbirds on his back, busy turning over the hairs with their beaks: the bullock, slowly shutting and opening his great watery eyes, rolling round his cud, and giving little grunts of delight, seemed to enjoy the tickling sensation (I am not sure that he knew what his feathered friends were doing for his good), as much as if a modern barber was brushing his hair by machinery. I never saw the nests of these birds, but think they build in holes in the walls, or rocks, if walls are not to be found.

Canada Jay, or Whisky Jack (*Perisoreus Canadensis*, Bonap.).—This and 'Steller's Jay' are the only representatives of the jay family in British Columbia. So familiar and confiding in its habits is this plain little ash-coloured bird, and at the same time so fond of being near the habitations of man, that Canadian settlers and gold-miners of the North-west style it the Whisky Jack, never harm it, and say that wherever man goes, Whisky and Whisky Jacks invariably follow. In cold weather I have seen poor little jack hop by the fire, perch himself on a log, ruff up his feathers, and warm himself as fearlessly as

if he had been reared and tamed in a shanty; hopping round on the look-out for crumbs, he slants his head, and looks so beseechingly with his glittering grey eyes, that he must have a hard cruel heart who could refuse such an appeal for a stray morsel, or injure trustful little jack. Indian children are their greatest enemies; they never wilfully kill them, but teaze the poor little fellows, until they die from sheer worry.

This jay has an immense distribution, extending from Vancouver Island through British Columbia, crossing the Rocky Mountains, and ranging down the eastern slopes into Canada; it is found also throughout the Northern United States. Its nest is, much like that of other jays, built generally in a close bush. Four to seven eggs are the usual number laid. They winter throughout British Columbia and in Vancouver Island.

Lesser Redpolé (*Ægiothus linaria*, Cabanis).—Rather a rare bird in British Columbia; it frequents swampy places, where the alders grow thickly, and large hollow-stalked water-plants flourish. To these it clings, and swinging, as if performing a trapèze feat, pecks away at the seed-pods, and searching the flowers if there are any remaining, gobbles up any beetles that may have

therein taken refuge. The song is a pretty soft warble, that comes in bursts, as if in joyous praise of some unusually fortunate capture; the singer perching itself boldly on the top of a plant, to be the more plainly heard by its companions. In early spring the redpoles feed right-royally, the long pollen-dusted catkins of the alder and hazel being much relished. I never saw its nest, though I repeatedly searched for it. They winter in small flocks in Vancouver Island, at its southern extremity.

The Lazuli Finch (*Cyanospiza amœna*, Baird).—This gaily-plumaged little bird, one of the 'painted sparrows,' visits Vancouver Island and British Columbia early in the summer, arriving at the Island in May, and rather later east of the Cascades. The colours of the male are nearly as brilliant as the gemlike humming-birds, the feathers having a similar metallic lustre—a brilliancy rendered the more conspicuous by contrast with the flowerless shrubs it usually frequents. The song is feeble, and only now and then indulged in by the male, to cheer his more sombre partner during incubation.

The nest is round, and open at the top, composed of various materials turned and worked together, lined with hair, and placed in a low

bush, usually by the side of a stream. Five eggs is the number generally laid.

Oregon Ground Robin (*Pepilo oregonus*, Bell).—This quaint restless bird is very abundant, from the coast to the summit of the Rocky Mountains, and is also very common on Vancouver Island. They arrive in April and May, and frequent dark woods and thick tangled underbrush. Stealthy and shy, its habit is to hide, but a love of hearing its own ugly voice invariably betrays the place of concealment. The cry—for it is not a song, but something like the squall of the cat-bird—comes from the most unlikely places, often startling one into a momentary belief in ghouls and wood demons. I found a nest, after days of tiresome waiting and watching; it was placed on the top of a stump, round which young shoots had grown like a fringe, completely hiding it from the sharpest eye; the birds descended to it through the twigs, that formed a vegetable tube. Not a neat nest, but clumsily put together with varied materials, lined with hair, and in it six eggs.

Grey-crowned Finch (*Leucosticte tephrocotis*, Swainson).—My first acquaintance with this very rare and beautiful bird was made on the summit of the Cascade Mountains, on a hill we named

Ptarmigan Hill, because these grouse were so very plentiful on it. It was late in October, and we were hurrying back to winter-quarters, hourly expecting the first fall of snow. I observed a flock of nine or ten birds pecking along the ground, much as larks feed; the more I looked at them, the more I was puzzled to imagine what birds they could be, at such an altitude, so late in the year. To settle the matter I fired in amongst them, and picked up three—a female, and two males in splendid plumage. I tried for more, but never saw them again on the Cascades.

In July, in the following summer, I was on the summit of the Rocky Mountains, near the Kootanie Pass, and again saw these beautiful birds feeding on the ground. I shot several, but all of them were young birds of the year, barely fledged, or badly-plumaged old ones. Hence there can be no doubt these finches breed on the Cascades and Rocky Mountains, in both about the same altitude, 7,000 feet above the sea-level. They are very late migrants, or they winter on the mountains; although I hardly think they could bear the cold, or find a sufficiency of food, the winter being very severe, and the snow three feet and more in depth.

CHAPTER VIII.

ROUTE TO THE SUMMIT CAMP — SPOKAN PLAINS — FEARFUL DESTRUCTION OF HORSES—SYNIAKWATEEN (OR 'THE CROSSING')—A BUTTERFLY ASSEMBLAGE—THE FOX-SPARROW—GOATSUCKERS — THE OSPREY—REDSTART — LOUISIANA TANAGER— DUSKY GROUSE — FRANKLIN'S GROUSE — RUFFED GROUSE — HARRIS'S WOODPECKER — GAIRDNER'S WOODPECKER — WHITE-HEADED WOODPECKER—THREE-TOED WOODPECKER—LOG-COCK—LEWIS'S WOODPECKER—A NEW CICADA (CICADA OCCIDENTALIS).

THE routes travelled by our various working-parties in order to reach the Summit Camp—situated on the Rocky Mountains, and the termination of the half of the Boundary Line we were commissioned to mark (the other half, east of the Rocky Mountains, the terminal point of which is at the Lake of the Woods, still remains unmarked)—ran in a southerly direction. This deviation from a more direct course was necessitated in consequence of impassable barriers of mountains, so closely piled and wooded, that the valleys between them were little else than rocky gorges, devoid of grass or other food for packed animals. Following the Colville valley for some distance, and thence through a sparsely-wooded

country we reach the Śpokan plains, which are open grassy wastes, very like the barren grounds we travelled through from Walla-walla to Colville.

The Spokan Indians live principally on these plains, Gerry being their chief. Gerry speaks very understandable English, which he picked up whilst acting as guide to Sir George Simpson. This large tribe has been awfully crippled by Colonel Wright, previously spoken of as commanding the United States troops at Walla-walla. The Indians made a cowardly attack on some unarmed dragoons exercising their horses, killed several men, and stole all the horses. Colonel Wright, in retaliation, marched into their stronghold, and after a brisk skirmish, routed them, taking several of the leaders prisoners, and with them a celebrated chief. These were all hung where the fight took place. Then all the Indian horses that could be collected were driven together by order of the Colonel and shot; 700 were thus killed; three days were occupied in shooting the poor beasts down. I state the fact as it was told me.

Branching off in a north-easterly direction, the trail leads through a thickly-wooded country to the Pend Oreille river, where our depôt, Syniak-wateen (Indian, the 'crossing:' vide illustration),

was situated. The scenery is picturesque beyond description; densely wooded on each side, the river winds its way through a series of grassy banks, flat and verdant as English meadows. In June these grass-flats are flooded by the melting snows, and for a short time the river assumes the appearance of a lovely lake. The Indians *en route* to the Buffalo plains, east of the Rocky Mountains, cross the Pend Oreille at this its narrowest neck—hence the name, Syniakwateen.

The place is a perfect paradise for the lesser migrants: sunny, sheltered, and abounding in insects and flowers, the birds live sumptuously, and find in the forest-trees and shrubby underbrush every variety of site for building purposes. Few more wonderful displays of brilliant colouring can be imagined than an assemblage of butterflies. 'Knights' and 'chevaliers' have a habit, in North and North-western America, of pitching together on the ground, choosing damp bare places for their gatherings; many hundreds of these brilliantly-coloured insects might be seen every day on these meadow-like river-banks, outvying in variety of tints any grouping of flowers the most skilful gardener could produce. For what purpose they thus congregate I am at a loss to imagine.

Here I first saw the Fox Sparrow (*Passerella Townsendii*, Nuttall). This sparrow is not, however, uncommon in dark swampy places east of the Cascades. It is remarkable as possessing a most singular habit—that of scratching dead leaves or decayed material of any sort with its feet, exactly as do barndoor fowls—sending the dirt right, left, and behind; it picks up seeds, insects, larvæ, or anything eatable that it digs out, and then goes on scraping for more. The long and unusually strong claws with which this bird is provided seem particularly well adapted to this unsparrow-like mode of earning a living. If one waits quietly in a dark swamp, in a few minutes the 'scratch, scratch' of several of these birds is pretty sure to be heard from under the tangle of fallen timber.

From daylight until dark Goatsuckers wing their way in mazy circles, like flights of gnats on summer evenings more than insect-catching birds—so very numerous are they at this favoured locality. The continuous 'pisk, pisk,' and sudden booming roar they make whilst flying, is heard in every direction—high in the air, and close to one's ear. They have various names given them, such as—

NIGHT HAWK—BULL BAT—MOSQUITO HAWK—the GOATSUCKER (*Chordeiles popetue*, Vieill) of

zoologists.—I have met with only one well-marked species from the coast to the summit of the Rocky Mountains. They arrive at Vancouver Island and along the coast in May, and at Colville in June. On the 7th of June I observed a great number of these goatsuckers in company with what I imagined to be the Black Swift, but as they never came within range I could not determine the matter. I succeeded in getting one goatsucker, a male; its stomach was gorged with winged ants; a flight of these insects had, as I imagine, attracted these birds.

When flying high the goatsucker makes a curious kind of chirp—hence the name by which they are known throughout Oregon and California, as *Pisk*; and when they swoop down, as they constantly do, from a great height, they make a loud booming noise, almost like a *roar*, or the twang of a large metal harp-string—whence I suppose comes the other name, *Bull Bat*.

I have noticed them 7,000 feet above the sea-level, both on the Cascades and the Rocky Mountains. They lay two eggs in July, on the bare ground. They have a curious habit of pitching on the ground just as it is getting dark, and running along like a sandpiper, chasing moths and small insects. I have often seen them pitch close to my feet.

Sitting on a tree overhanging the river, or soaring gracefully high in the clear atmosphere, the Osprey or Fishing Eagle may be seen at all times.

THE AMERICAN OSPREY (*Pandion carolinensis*, Gmelin) is found on nearly every river and lake from the coast to the west slope of the Rocky Mountains; it is also quite as plentiful on the lakes and streams in Vancouver Island. They quit the streams inland on the approach of severe winter weather, and retire to the coast or go south. The nest of the osprey is a most conspicuous object, and can be seen from a long distance; it is invariably built on the extreme summit of a dead pine-tree, madè of dry sticks, and in size as large an an imperial bushel.

The ospreys use the same nest year after year; the number of young is usually three. There was a particularly large nest in the centre of a small prairie through which the trail ran, leading from Sumass to the Chilukweyuk prairie: it was placed on the top of a dead pine-tree that was at least 150 feet high, and as straight and bare of branches as a flagstaff; at the base of the tree the trail forked, the other trail leading to Sweltza; the turn-off was known as the Eagle's Nest. I shot two, a male and female, in August, on the

stump of a dead tree hanging over the Kootanie river, feeling desirous to obtain specimens from that locality. Specimens were also obtained at Sumass, Vancouver Island, and Colville, and there can be no doubt there is but one species common to the entire district.

THE REDSTART (*Setophaga ruticilla*, Swainson).—This exquisite little bird, more like a tropical sea-shell than a feathered songster, I met twice only in my rambles—once at this place, and again in the Colville valley; both were males, and in full nuptial plumage. From its extreme scarcity I am disposed to think it is only an occasional visitor to the eastern slopes of the Cascades, the ridge being its boundary northwards. The birds I obtained were shot in July.

LOUISIANA TANAGER (*Pyranga ludoviciana*, Bonap.).—I never saw this bird west of the Cascade Mountains; it arrives here and at Colville in June. Male birds are first seen. On arriving, they perch on the tops of the highest pine-trees, and continually utter a low piercing chirp. Soon after they pair, and disappear into the forest. Where these birds build I cannot imagine; I have sought high and low for the nest, but never succeeded in finding it. I am inclined to think they must build on the tops of the very loftiest pine-trees; they leave again in September,

but never assemble in flocks. Its range is south through Oregon and California; how far north of Colville I had no means of finding out.

The Dusky and Franklin's Grouse are constant articles of daily food to us, being abundant throughout this district.

THE DUSKY GROUSE (*Tetrao obscurus*, Say—figured and described by Sir John Richardson, 'F. B. A.') is found principally on the western side of the Rocky Mountains. It arrives at Vancouver Island, at Nesqually, and along the banks of the Fraser river about the end of March and beginning of April. The male bird, on its first arrival, sits on the summit of a tall pine-tree, or on a rock, announcing his arrival by a kind of lovesong—a sort of booming noise repeated at short intervals, and so deceptive that I have often stood under the tree where the bird was perched, and imagined the sound some distance away. It is extremely difficult to see this bird when you know it is in the tree, so much does it resemble a knob or the end of a dead branch. Soon after their arrival they pair, but during the whole nesting-time the male continues the booming noise. The young are a good size in August, but never afford much sport, as they pitch in the trees immediately after being flushed.

Between the Cascades and Rocky Mountains this larger grouse seems to be replaced by, if not a distinct species, a very well-marked variety. In size it is a trifle smaller, but the great mark of distinction is the entire absence of the white band at the end of the tail. Finding, however, in some mature birds a trace of white, I hesitate as to making it a new species. The young nestlings, eggs, and mature male and female birds, from east of the Cascades, are in the British Museum, as well as others from the west or coast slope. In habits, periods of arrival and departure (or perhaps appearance and disappearance would be the more correct expressions), the two species or varieties are in every respect similar. Where they go during the winter I cannot imagine; the Indians say they go to sleep in the pine-trees. I do not think they migrate, but only retire into the very thickest trees, and, living on the fronds, pass the winter thus sheltered in the bush.

FRANKLIN'S GROUSE (*Tetrao franklinii*, Douglas).—I believe this bird is but rarely found west of the Cascades; but on the eastern side, and along the whole district lying between the Cascades and Rocky Mountains, it is tolerably abundant, always keeping in the mountains, often as high as

7,000 feet above the sea-level. It is the most stupid bird imaginable: when five or six are flushed together, they fly up into the nearest pine-tree, and there sit; throw sticks and stones at them, until you are tired, and they scorn to be frightened. I have often shot one or two in a tree where others were sitting, without their attempting to fly away. They remain in the deep woods and sheltered places during the winter, and feed on the leaves of the pine-tree. They begin nesting in May, and in proceeding from Colville to the Rocky Mountains I saw lots of chickens in June and July not long from the nest. I do not think these birds pair, in the strict sense of the word; but from the large number of females compared to males, I am disposed to think they are polygamists. I never succeeded in obtaining the eggs, but the mature birds and chickens are set up in the British Museum.

It may be as well to mention here the different woodpeckers common in the pine-forests, open timbered lands, and shrubby brush surrounding the lakes and prairies both east and west of the Cascades:—

HARRIS' WOODPECKER (*Picus harrisii*, Aud.). —This woodpecker is by far the most abundant

species in the district. It is found on Vancouver Island, and along the entire course of the Boundary-line, south through Oregon and California, north to Fort Simpson: a few remain at Colville during the winter, but the greater number retire to the coast, and return in April and May. In May they pair, and bore out a hole in a dead tree; they use no lining for the nest, but lay the eggs on the bare wood. Their favourite haunt is on the stumps of trees growing round swamps or prairie-land.

GAIRDNER'S WOODPECKER (*Picus gairdneri*, Aud.).—The same remarks apply to this woodpecker as to the preceding, *Picus harrisii*. It differs slightly in habit, generally hunting for insects on the maples, alders, and stunted oaks rather than on the pine-trees. Specimens of both species were shot on Vancouver Island, Sumass prairie, Colville, and west slope of the Rocky Mountains, at an altitude of 7,000 feet above the sea-level.

WHITE-HEADED WOODPECKER (*Picus albolarvatus*, Baird).—The only place I ever saw this very rare bird was in the open timbered country about the Colville valley and Spokan river; why it should be confined to such a limited area I am somewhat at a loss to imagine, except it be that this woodpecker almost invariably haunts the

Pinus ponderosa, and never retires into the thick damp forest. It arrives in small numbers at Colville in April, and disappears again in October and November, or as soon as the snow begins to fall. Although I did not succeed in obtaining its eggs, I saw in the month of May a pair nesting in a hole bored in the branch of a very tall pine-tree (*Pinus ponderosa*). This bird seldom flies far, but darts from tree to tree with a short jerking flight, and always whilst flying utters a sharp, clear, chirping cry. The specimens sent home were shot in the Colville valley.

Black-backed Three-toed Woodpecker (*Picoides arcticus*, Swainson).—I obtained this bird once only; it was on the summit of the Cascade Mountains. It was late in September, and getting cold; the bird was alone, and flying restlessly from tree to tree, but not searching for insects. Both when on the wing and when clinging against a tree, it continually utters a shrill plaintive cry. Its favourite tree appears to be the *Pinus contorta*, which grows at great altitudes. I do not think this woodpecker is found except on the hill-tops. In the valleys and lower plains it is replaced by the Banded Three-toed Woodpecker (*Picoides hirsutus*).

Log Cock (*Hylatomus pileatus*, Baird.).—Not

often seen, and difficult to obtain from its shy habits, always hiding in the dark pine-forests, the silence of which is often broken by the tremendous noise this bird makes, rapping on the dead trees. It has a wide range—common east and west of the Cascades, and on the west slope of the Rocky Mountains; I have seen it north as far as Fort Rupert (Vancouver Island), and south through Oregon and California. Whether they migrate south I do not know, but I obtained them at Colville during the winter. Nests in May, generally in a tall dead pine-tree at a great height.

LEWIS' WOODPECKER (*Melanerpes torquatus*, Bonap.).—Not found, as far as I know, west of the Cascades, but is very abundant between the Cascades and the Rocky Mountains; it here frequents the open timber. Its habits and modes of flight are not the least like a woodpecker's; it flies with a heavy flapping motion, much like a jay, feeds a great deal on the ground, and chases insects on the wing like a shrike or king-bird. Whilst mating they assemble in large numbers, and keep up a continual loud chattering noise; they arrive at Colville in April, begin nesting in May, and leave again in October. The nest is in a hole in a dead pine-tree, usually

a great height from the ground; the eggs brought home were obtained at Colville.

Striking in among the trees, and following on a trail for about a quarter of a mile from our log-house, I came suddenly on an open glade (or more aptly, perhaps, I may compare it to a meadow), such as one often stumbles on in Devonshire.

The grass was green, and peeping out in all directions were wild flowers of various species. A tiny stream, clear as crystal, twisted its way in many a bend and turn through this fairy spot. No human voice had ever, perhaps, disturbed the silence of this unusually solitary glen; but the song and twitter of birds, and the buzz and hum of insect life, told at once that flower and tree were alike inhabited.

But there was one sound—song, perhaps, I may venture to call it—that was clearer, shriller, and more singularly tuneful than any other. It never appeared to cease, and it came from everywhere—from the tops of the trees, from the trembling leaves of the cottonwood, from the stunted underbrush, from the flowers, the grass, the rocks and boulders—nay, the very stream itself seemed vocal with hidden minstrels, all chaunting the same refrain. It was the first time I had heard this song in these wilds; and although

I had not yet caught sight of the singer, I knew that it must be a cicada. I soon pounced upon the singular little vocalist, and captured him in his native orchestra. He was a handsome little fellow, with large bright shining eyes, wings like the most delicate lace, coloured green, like the leaves it loves to sit on, its body clothed in scales like fairy armour. It turned out to be an entirely new species, and now figures in the British Museum as *Cicada occidentalis*.

The genus *Cicada* is found in all the temperate and warm countries of the globe; some of them are nocturnal revellers, others, as our friend, singing only in the daytime. They were celebrated among the Greeks, who often kept them in cages for the sake of their song. They believed the cicadæ lived on dew, and regarded them as almost divine. It was the nightingale of the nymphs. Anacreon, hearing the cicada, says, 'The Muses love thee; Phœbus himself loves thee, and has given thee a shrill song; old age does not wear thee out; thou art wise, earthborn, musical, impassive, without blood; thou art almost a god!'

The Athenian ladies wore golden cicadæ in their hair, and it was used as the head-piece of the ancient harp. The following fable will, per-

haps, account for it: Eunomus and Ariston, two rival musicians, were contending against each other; each played the harp, and it was hard to say which was the better player, when 'crack' went one of the strings of Eunomus' harp. A cicada at once pitched on the top of the instrument and supplied the want of the broken string, and so effectually that Eunomus was declared the victor.

But the male Cicada has a shadow to cloud the bright sunshine of his happiness; a sad and sorry misfortune, I am afraid all my lady-readers will say, and I quite agree with them. The gentler sex, the Ladies Cicadæ, are all, without an exception, dumb. Some crabbed old Greek, evidently a bachelor or henpecked husband, has dared to say (I believe he was called Anaxagoras),

> Happy the cicadas' lives
> Since they have all voiceless wives!

Well, if she does not waste all her day in singing and scolding, she attends to her duty as a mother; and, whilst her idle husband carols his simple ballad, she is busy depositing hundreds of eggs in the branch of a tree.

Admirably adapted to its purpose is the ovipositor of the female cicada! A borer of the most

delicate structure, edged with a kind of saw or file-like apparatus, enables her to make a slit in the bark of a tree, into which the eggs are dropped. The eggs are white, somewhat oval, and quite flat, so as to pack neatly into the slit. The larva is an ugly little monster, with six legs, and a soft body of a dirty-yellow colour. Two years of his life are passed away in the earth, and the time arrives when the dark damp tunnels are to be abandoned; then from a creeping grub he changes into a winged denizen of the air, and with his voiceless mate spends a short but merry life, in ceaseless exultant jubilee.

That the cicada lives on dew is not by any means a poet's fancy. Having assumed the winged form, it loses the scissor-like mouth, that served its purpose admirably in the subterranean home for nipping up fine root-fibres, and has in its place a kind of sucker-like snout, with which it sucks up the juices of flowers and the sweet sap that exudes from the bark of trees. Happy as his life appears to be, he has many terrible enemies to encounter during the two months of his perfect existence. The brilliant oriole, in his gorgeous livery of orange-and-black, hunts for him under leaves and in the grass; and spying him out, nips him with its sharp beak, and descending

to the ground picks him to pieces, and, like a dainty epicure, swallows only the choicest bits; the Louisiana tanager, flashing like a gem in the golden sunshine, seizes on him and gobbles him up bodily; crafty woodpeckers and stealthy prying little flycatchers pounce upon him in the midst of his song, and end his life ere yet it has well begun. It shows us how wise is Creative Wisdom in endowing these harmless little insects with such vast powers of reproduction! If one female only succeeds in safely depositing her eggs, at least seven hundred larvæ are produced; and may it not be that, being voiceless, she is less likely to be discovered than the male?

The structure of the apparatus with which the males execute their long-continued, shrill, monotonous music is most singular, and well worth investigation. It is a sort of compound instrument, between a banjo and a violin, consisting of two membranes tightly stretched, and acted on by powerful muscles; the sound issues from two holes near the insertion of the hind-legs. The intensity of the sound produced varies in different species, dependant in a great measure on the size of the instrument. One species, found in Surinam, produces such ringing tones from his musical apparatus, as to be distinctly heard at a

mile distance—hence he has obtained the name of 'the harper' (*lierman*). Virgil says the Italian cicadæ burst the very shrubs with the noise they make:—

Et cantu querulæ rumpent arbusta cicadæ.

I was curious to watch the female depositing her eggs. She first clasps the branch both sides with her legs, and with the end of the file very carefully slits up the bark; then, placing the instrument longitudinally, files away until she has obtained sufficient length and breadth. The *small* teeth of the files are now used crosswise of this fissure, until a trench is made in the soft pith. When large enough, slowly down the groove in the centre of the instrument glides a small pearly egg, pointed at both ends, and so transparent that the little grub within is easily discernible. Gently she lays it within its bed, and then drops a thin gummy material on it, to secure it from moisture. This finished, she proceeds to deposit another, and so on, until a sufficient number are produced to fill the fissure; then over all she drags the everted bark. It is easy to perceive where the cicada has been concealing her brood, by the elevation on the branch. In this manner she deposits about seven hundred eggs, going from

branch to branch, her marvellous instinct teaching her to select the most suitable wood for the purpose. The time occupied in constructing each nest was from fifteen to twenty minutes. Her earthly mission finished, she drops, fainting and exhausted, from the branch, and dies.

The male, who is always trilling his refrain, goes on indifferent, or unconscious, that the task of his faithful spouse is finished, singing ever, until his time comes—then he, too, drops beside her. Thus the songs, one by one, cease—not only the cicada's, but all the forest choir—and give place to the winter blasts, that sigh in mournful music through the leafless trees. These winds tear from the trees the decaying branches, which the instinct of the insect proclaimed were dying months previously. From the nests that are in these fallen branches, it is easy for the grub, the larva of the cicada, to bury itself in the earth, its future home; but those that come out whilst the branch remains on the tree, have to make a perilous descent. Fifty to sixty days from the time the eggs were deposited, there emerged an ugly little yellowish grub, covered with soft hair, lively and bustling; with pinkish eyes, and with feet armed with claws; if on the tree, they rushed directly to the end of the branch, and, without

any apparent fear, precipitated themselves recklessly to the ground, where, without loss of time, they commenced digging. Their forelegs, shaped somewhat after the fashion of a mole's, enable them to turn up the ground with great expedition, ten to twelve seconds being long enough for one to get entirely out of sight. How long they remain in the larvæ condition I am unable to say.

An Athenian banquet, without an *entrée* of cicadas, was deemed as great a failure as would be, in these days, a Greenwich feast without whitebait. The larvæ and pupæ were esteemed the greater dainties, but a female full of eggs, artistically browned, and served up hot and juicy, was a *bonne-bouche* the Greek epicure well knew how to estimate. Even Aristotle thought the dish a luscious one, '*quo tempore gusta suavissima sunt*,' and at the present time cicadæ are regularly sold in the markets of South America. The legs and wings are stripped off, and the body of the insect slowly dried in the sun. When sufficiently dry, it is powdered, and made into a kind of cake, and in that form sold and eaten.

CHAPTER IX.

FROM SYNIAKWATEEN TO THE PACK RIVER—FROM PACK RIVER TO THE KOOTANIE—THE TOBACCO PLAINS—HUDSON'S BAY COMPANY'S TRADING-POST—THE KOOTANIE INDIANS—A KOOTANIE CANOE—THE GALTON RANGE AND FLATHEAD RIVER—THE MOOSE DEER—WAPITI OR OREGON ELK—CARIBOU—VIRGINIAN DEER—WHITE-TAILED DEER—BLACK-TAILED DEER—MULE DEER—THE ASCENT OF THE ROCKY MOUNTAINS—CAMP IN THE GLEN—YELLOW-HAIRED PORCUPINE—SAY'S STRIPED SQUIRREL—PINUS CONTORTA—ROCK PTARMIGAN—THE MOUNTAIN GOAT—THE BIGHORN AND ROCK-WHISTLER.

LEAVING Syniakwateen, the trail runs through twenty-five miles of dark, gloomy, grassless forest, until reaching the Pack river, a small stream, except in the flood-time: from this river to the Kootanie, the trees are less thickly clustered.

In the Kootanie valley there is an abundance of grass; we crossed the river at its south-eastern bend, to reach the Tobacco plains, a gravelly waste, the grass on it at this time (July) completely dried into hay by the sun. A small trading-post of the Hudson's Bay Company stands near the crossing, occupied by one trader, who obtains the

peltries' undressed skins, trapped by the Kootanie Indians, a fine tribe owning large herds of cattle and a great number of horses.

All the savages I saw wore small brass crosses suspended from their necks, and invariably made the sign of the cross on their breasts when they shook hands. Two Romish priests have been long resident in the Flathead country; these indefatigable men pay regular visits to the Kootanies, and from their teachings these outward signs of Christianity have been learned.

Their canoes are of a most singular shape, not unlike the Kallispellem canoe shown in the illustration of Syniakwateen. They are made of a large sheet of bark, stripped from the spruce-fir, which is tightly sewn at both ends, but sloped to form a conical point. The length of the bottom of the one I measured was 12 feet, the width between the gunwales only 7½ feet; the bark is supported on ribs of split wood, and gummed where there are any holes or weak places.

When an Indian paddles it, he sits at the extreme end, and thus sinks the conical point, which serves to steady the canoe like a fish's tail, while the other is raised clear above the surface. They are more easily upset than any

canoe I was ever in, but with skilled hands carry a fair-sized load, and pass rapidly over rather than through the water.

The altitude of the Kootanie pass above the sea-level is about 2,100 feet. Crossing the lower corner of this immense valley, our trail led up to the Galton Mountains, a massive range dividing the Kootanie and Flat-head rivers, and attaining an altitude of quite 8,000 feet above the sea-level. These mountains afford on their slopes admirable pasturage for horses and ruminants, being the favourite hunting-grounds of the Kootanies west of the Rocky Mountains.

I may mention, incidentally, that buffalos never pass from the east to the west side of the Rocky Mountains; hence the Kootanies cross the Kootanie pass every summer to hunt on the plains east of the mountains, for buffalo-meat, and their skins called robes. This will be the best place to briefly describe the different species of deer I saw in British Columbia, or in Washington Territory, immediately adjoining it; most of them, if not all, are to be found in the Kootanie country.

THE MOOSE (*Alce americanus*, Jardine).—I never obtained a specimen, neither did I ever see the moose-deer on the west side of the

Rocky Mountains, but on a trail that leads over a sandy waste, just before descending into the valley of the Flathead river, I picked up several shed moose-antlers; this was about 4,000 feet above the sea. Traders of the Hudson's Bay Company and Indians have also told me that moose are frequently killed on the western slope of the Rocky Mountains. I feel quite sure that the moose still inhabits the Galton range of mountains, and would be also found, if properly sought for, in the open timbered land at the base of the western slope of the Rocky Mountains.

The district is well adapted to the habits of the moose: the ground irregular, and covered with an open forest-growth, in the hollows forms mossy swamps, in which grows an abundance of willow, the young shoots of which constitute the favourite food of the moose. A moose-hunter is ever watchful for cropped willow-branches or morsels of partially-chewed food, dropped as the animal walked along. A moose always walks on the very points of its toes, so that its track is in dots arranged in pairs, at a distance of three to four feet from each other. If the ground is very soft, the foot-prints are more like those of a wapiti, but a practised eye can tell the difference at a glance.

As a rule, a hunter never follows directly on

the track of a moose; before it lies down, or stops to feed, it invariably doubles back on its own tracks, after going for some distance against the wind, so that anyone following would taint the wind, and in all probability pass the animal's hiding-place. Coming on the trail of a moose that has not been disturbed, the hunter makes a circuit, to cross the track some distance ahead: if he has a keen eye, he readily detects the dots as he crosses them at right-angles. If he does not find the tracks, he concludes the moose has doubled back; by another circuit he returns to the track, and works up cautiously against the wind, until he discovers the hiding-place of the moose. Great care, and long practice too, is needed to enable a hunter to wind his way like a snake through the bushes, without cracking the dead branches. The flap of its great ear generally betrays the moose; large as the animal is, a hunter's practised eye can alone make it out when ensconced in its lair.

The top of the antlers and flapping of the ears are usually the only guides to determine the position of the body: the spot to aim at fixed on in the hunter's mind, he fires into the bushes; then follows a crash, as the animal either falls, mortally hit, or dashes away through the crackling

timber. It is seldom an experienced hunter ventures to risk a shot when stalking, until within twenty yards of the moose.

American Elk* or Wapiti (*Cervus canadensis*, Exl.).—This magnificent deer has a greater range, and is more widely and generally distributed, than any other deer in North-western America. It is found along the entire coast range from California to Sitka, on Vancouver Island, and on several of the islands in the Gulf of Georgia, on the east and west slopes of the Cascade Mountains, on the western slope of the Rocky Mountains, reaching an altitude in summer of 7,000 feet above the sea. I saw herds of these elks in the Klamath district; they grow to a large size in these rich pastures, attaining a weight of from 500 to 700 pounds. The antlers are enormous in the adult animal, measuring six feet from tip to tip, and eleven inches in circumference above the burr. I scarcely think there are sufficient grounds for making this Oregon Elk a distinct species; it seems to me to be a well-marked variety only of the wapiti common to the eastern side of the Rocky Mountains. The wapiti on the Oregon

* I use the term *Elk*, for the Wapiti, in its local sense. Strictly, it applies only to the Moose.

coast grows much larger, and differs in colour from the animal found on the inland mountains; but climatal differences are quite sufficient to account for it. The habits of the wapiti are too well known to need any description.

WOODLAND CARIBOU REINDEER (*Rangifer Caribou*, Aud. and Bach.).—The Caribou inhabits the high ridges of the Cascade Mountains, the Galton range, and western slope of the Rocky Mountains. I have no positive proof of its existence north of the Fraser, but I think there can be but little doubt, if any, that its range is through the entire mountain district, extending into Russian America.

VIRGINIAN DEER (*Cervus Virginianus*, Bodd); WHITE-TAILED DEER (*Cervus leucurus*, Douglas).—Whether these are really distinct species I cannot say, but the small grey deer so common on the plains about Nesqually and in the timber belting the Sumass prairies, I believe to be *Cervus leucurus*. I obtained two specimens on the Diamond Tree pass, a high mountain ridge ascending sharply up from the Sumass prairie, in December—one a young male, the other a doe heavy in fawn—and have no doubt about their being the above species. I have also seen this deer on Vancouver Island, and in the Kootanie region.

BLACK-TAILED DEER (*Cervus Columbianus*, Richd.).—This deer has by far the widest range, and is more numerous than any other species of the smaller deer. It is found on Vancouver Island, on a great many of the islands in the Gulf of Georgia, on the plains of Nesqually, eastern and western slopes of the Cascades, and through the entire district intervening between the Cascades and the Rocky Mountains; south it extends through Oregon into California. I saw herds of them on the Klamath plains.

The Sumass Indians had a very ingenious mode of coaxing the male within shot during the hunting season. They make a call or whistle from the hollow stalk of a water-plant, and hiding in the bush imitate the cry of the doe; by this artifice they entice the male to come close to them. Their favourite resort seems to be in the timber, about open plains, prairies, and on high ground, during the summer months, but descend for shelter and protection into the valleys on the approach of winter and snow. Their fawns are dropped in May, two being by no means unusual.

MULE DEER (*Cervus macrotus*, Say).—I am far from sure as to the existence of this curious deer west of the Cascades, neither do I think it is at all plentiful on the eastern side. The speci-

mens brought home were obtained at Colville during the winter months; I also saw other very fine specimens in the possession of two Indians, in the Shimilkameen valley. It is found on the Spokan plains, and in the adjoining forests, on the Tobacco plains in the Kootanie district, and on the slopes of the Galton range of hills.

The trail follows the eastern slope of the Galton mountains to the Flathead river, a good-sized stream. The Flathead valley is about 4,005 feet above the sea-level, sandy and thinly timbered; such vegetation as there is, evidences a particularly dry climate. From this valley, after fording the stream, the ascent of the Rocky Mountains commences, a gradual incline through rather thick timber for some distance; then over a steep hill 6,970 feet above the sea, to descend its eastern slope and reach a glen. Wild and beautiful is the scenery on every side: right and left stupendous pinnacle-like hills, white with snow, seem to reach to the clouds; ridge follows ridge, each seeming to be more craggy and massive than its fellow, as far as the eye can scan this wondrous landscape. Aptly has this great central axis of elevation been named the Rocky Mountains; one is puzzled to imagine how such masses of rock could have been up-

heaved to so great an altitude. The main trail from this glen leads over the Kootanie pass to the Buffalo plains of the Saskatchawan; our trail to the astronomical station, near the 49th parallel, 6,480 feet above the sea-level; above this nearly 6,000 feet more altitude could be gained by climbing.

Whilst at our camp in the glen I obtained two rather rare animals, one—

The Yellow-haired Porcupine (*Erethizon epixanthus*, Brandt).—A quaint-looking beast, that may be seen in the Porcupine Case in the British Museum; the quills are entirely hidden by a long silky coat of yellowish hair. Of its habits I know very little; living entirely in the dense forests, watching it is an impossibility. It feeds on the bark and succulent shoots of the shrubs and trees composing the underbrush: for nipping these off the jaws they are armed with four powerful incisor-teeth, sharp as chisels.

Say's Striped Squirrel (*Spermophilus lateralis*) is one of the most beautiful of the Spermophiles ('seed lovers.') Its size is about that of the ordinary red squirrel. Instead of the quiet sombre garb usually worn by its brethren, this little squirrel is clad in the gayest costume imaginable; and as it nimbly

skips from rock to rock, or darts along a fallen tree, the stripes assume a ribbon-like appearance, unlike any animal's coat I ever saw.

Two broad stripes of jet-black mark each side of the animal, and extend from the shoulders to the thighs; between each pair of stripes is a line of equal width, of a yellowish-white. The medium region of the back is a rich grey; chestnut-brown, mottled with yellow and black, colours half the thighs, and extends over the hips, shading away into the grey on the back. The tail is rather short, but very brushy; the under-surface, coloured a bright yellow-brown, is margined with a much lighter tint of the same colour. Above the tail is grey, like the back. Length about seven inches; tail four inches without the terminating hairs.

It feeds principally on young grass and the juicy stalks of succulent plants; extending from the holes or clefts where they reside, trails beaten like footpaths lead in the direction of the favourite herbage. It is a most active and watchful squirrel: at the slightest noise it bounds with astonishing speed, and takes leaps almost equal to those of the flying-squirrel to reach its hole, uttering as it runs a low plaintive whistle. Conspicuous as this squirrel's coloration appears when viewed apart from its habitat, nevertheless, it

admirably accords with the light and dark markings peculiar to the slaty rocks amidst which I saw it; when the animal is perfectly still, it is quite impossible to make it out to be other than a portion of the rock, until by moving it betrays itself.

The most conspicuous pine in these elevated districts is the *Pinus contorta*. It thrives at an altitude of 7,000 feet above the sea-level. Where there are Indians the young trees of this species are invariably stripped of their bark to a height of seven feet from the ground, or as high up the trunk as an ordinary person can reach. This is done in order to procure the inner bark, which the savages use as food; they eat it in the fresh state as peeled from the tree, and compressed into cakes, in which state it can be preserved for a long time, and is easily carried.

The Summit Camp is placed in a snug nook under a massive slaty kind of mountain; there is little to be seen from it save rugged hilltops and snow. Near the terminal point of the Boundary-line is the watershed, and it is hardly an exaggeration to say one may sit and smoke his pipe with one foot in the water that finds its way into the Atlantic, whilst the other is bathed in that flowing into the Pacific.

THE ROCK PTARMIGAN (*Lagopus rupestris*) and a few smaller birds, were the only members of the feathered tribes I saw. The ptarmigan had their chickens with them; the parents and young grouse may be seen in the British Museum, obtained at this camp.

THE MOUNTAIN GOAT, which is in reality nearer an antelope (*Aplocerus montanus*, Grd.), is a most conspicuous feature amidst this rocky desolation. Gazing on some unusually splintered and contorted hillside, suddenly a small herd of mountain-goats come, as if by magic, round a jutting corner, and deliberately march along on a ledge, where, to all appearance, a cat would be puzzled to find a firm foothold; frighten them and they gallop with equal safety, and, springing from one side of a chasm to another, pitch like a bird, rather than a hard-hoofed fourfooted beast, on the narrowest ledges. The females had kids (or fawns, perhaps is more correct) by their sides. I ate some of the flesh, but its flavour was goaty in the extreme.

THE BIGHORN or MOUNTAIN SHEEP (*Ovis montana*, Cuvier) is also a tenant of the lower ridges of these mountains. I did not see any, but the Indians say they often kill them. The

bighorn is also found on the middle and upper ridges of the Cascades.

The Hoary Marmot (*Arctomys okanaganus*), or, as styled by the fur-traders, the 'Rock Whistler,' lives on the very summit of the Rocky Mountains.

If there is a spot on the face of the globe more dismal, solitary, inhospitable, and uninviting than another, that spot is where this most accomplished siffleur resides; and it is not by any means a matter to be wondered at, that so very little is to be found, in works on Natural History, relating to this little anchorite's habits.

My purpose being to climb the craggy ascent that led up to the watershed—not by any means a dangerous thing to do; it was simply leg-aching, tiresome, scrambling work. The grass being dry, it polished the soles of my mocassins, until they became like burnished metal; so that progression, up the long green slopes, was much the same as it would have been up an ice-slant, with skates on. I got up at last, and, feeling somewhat fagged, seated myself on a flat rock, unslung my gun, lighted my pipe, and had a good look at everything round about me.

The sun had crept steadily up unto the clear sky, unflecked by a single cloud; the mists, that

in the early morning hung about the ravines, and partially veiled the peaks and angles of the vast piles of rocks, had vanished, revealing them in all their immensity. Below me was a lake, smooth as a mirror, but the dark-green cold look of the water hinted at unfathomable depth. Tiny rivulets, fed by the snow, wound their way, like threads of silver, between the rocks and through the grass, to reach the lake

I was not so much impressed with the beauty of the landscape, as awed by its substantial magnificence. Few living things were to be seen save a group of ptarmigan, sunning themselves on a ledge of rocks, a couple of mountain-goats browsing by the lake, and a few grey-crowned linnets,—birds seldom seen but at great altitudes. There were also the recent traces of a grizzly, or black bear, that had been munching down the wild angelica. A solemn stillness intensified the slightest sound to a supernatural loudness—even a loosened stone rattling down the hillside made me start; there was no buzz and hum of busy insects, or chirp of birds, or splash of torrents, to break the silence; the very wind seemed afraid to moan: it was deathlike silence to the very letter.

As I smoked away, silent as all about me, sud-

denly a sharp clear whistle, that awoke the echoes far and near, thoroughly roused me, and sent all other thoughts to the rout. As I could see nothing, I deemed it expedient to remain quiet. Cocking my rifle, I lay on the grass, and waited patiently for a repetition of the performance. I had not long to tax my patience: again came the same sound, then others joined in the refrain, until the place, instead of being steeped in silence, resembled the gallery of a theatre on boxing-night.

I very soon spied one of the performers, seated on the top of a large rock; its position was that of a dog when begging. With his forefeet he was busy cleaning his whiskers, smoothing his fur, and clearly going in for a somewhat elaborate toilet: perhaps he was going a wooing, or to a morning concert, or for a constitutional, or a lounge on the 'Marmot's mile;' but whatever his intentions were, I regret to say they were frustrated. Solely in the cause of science I had to stop him; resting my rifle on a flat rock, as I lay on the ground, I fired, and the sharp crack, as it rang amid the rocks, was the whistler's death-knell.

Rapidly reloading, I scampered off to secure my prize. I am afraid there was not much pity felt—delight at getting a new animal was uppermost.

Smoothing his fur, I plugged the shot-holes, examined him closely, measured him; admired his handsome shape, bright-grey coat, and brushy tail; investigated his teeth and claws, walked back, and had a look at him from a distance; then set to work, and skinned him. You can see him also, if you like to visit the British Museum, where this very victim is 'set up,' and placed amidst the Marmots; his name, together with that of his destroyer, black-lettered on the board to which he is affixed. At the sound of the rifle, every one of his companions took sensation-headers into their holes, and did not come out again during my stay on this occasion.

The length, from the nose to the root of the tail, was a trifle over twelve inches; the tail six inches; head oval, and very flat; nose, short and broad, thickly covered with fine hairs; the cutting (incisor) teeth large, strong, and of a yellow colour; whiskers, black and long; ears, nearly hid by the fur on the neck and vertex; the claws, strong and curved, are admirable digging implements. The general tint is that of a rusty-grey, with a blackish conspicuous band extending from the back of the head down the shoulders. I need not give a more minute detail of specific characters.

In habits marmots are essentially sociable animals, inasmuch as they live in little colonies; but, unlike some of the prairie marmots, these rock-whistlers, when married, have a house of their own; and if blessed with a family—a blessing seldom denied them—they kick out the youthful pledges of affection as soon as they can nibble up a living for themselves. The burrow, which is quite two feet in diameter, is dug invariably in a slanting direction, generally at the base of a rock, standing up like a pedestal, on which they love to sit and whistle. Wide trails, bare-like roads, lead in all directions from their holes to the feeding and drinking-places; their hours of repast, sensibly chosen, are early in the morning, when the grass and herbage is wet with dew.

For only a few months, during summer, is this quaint little miner permitted to revel in the luxury of light; for seven dreary months out of the twelve does he sleep out his drowsy existence. What a wise and wonderful provision, to secure from utter extinction animals compelled to live in these icy regions, is hybernation! Growing wondrously fat during the summer, they retire, when the nipping cold and deep snow comes, into burrows lined with soft warm bedding; there become semi-torpid, and literally a

living stove; for the fuel, stored as fat, is slowly burned up in the lungs, giving out heat just as coal would in a fire-grate. Thus the rock-whistler heeds not the chilly blasts that sweep through gorge and glen, and so sleeps on safe from harm, until Sol comes to set him free.

The Redskin is the whistler's most implacable enemy; he never tires of hunting and trapping the little animal, delighting to use his jacket in the fabrication of rugs. The hair being thick, the marmot-robe keeps out both wet and cold, and stands an immense amount of wear and rough usage. Much as the savage likes the coat of his captive, he likes his carcase even better. When skinned a long peeled stick is thrust through the body, from tail to head; then placed slantwise, one end being fast in the ground, the treasured morsel is slowly roasted over a gentle fire.

I can bear testimony to the delicacy of roasted marmot; it beats Ostend rabbit hollow; all honour to the redskin's taste! A dinner off a roasted rock-whistler, washed down with a pull at the crystal stream, is a repast not to be despised.

It would prove of little interest to the reader to go again over the ground we have, I trust, travelled pleasantly together. The Boundary line

was completed too late to return that same year, so another dreary winter was spent at Colville: the cold was so intense that the ink froze in the pens, even when it was kept hot before the fire, and thus put a stop to all writing; the steam rising from the teacups would freeze into a kind of sleet, and fall again on the table. Still, in spite of this intense cold, if the air was still, as it usually happened to be, no inconvenience was felt, and we all wandered about with but little if any warmer clothing than we wore at Vancouver Island.

Whilst we remain here, I may as well give a brief account of packing, camping, and provisioning, and the general features of the Boundary line, as well as the natives and their dogs.

CHAPTER X.

CAMPING—PACKING—PROVISIONING—THE BOUNDARY TOUR.

To know how, when, and where to camp, and to be practically familiar with the systems of transport, necessitated in a country where roads, wheels, and 'iron horses' are unknown, forms by no means the least valuable part of a traveller's experience. Twelve years of constant practice in 'the art of travel,' spent in various parts of the world, has taught me very many useful lessons, that may be, possibly, valuable to those who intend devoting a portion (be it large or small) of their lives to wandering through uncivilised regions.

A tent should always form part of a traveller's equipment, if possible (my remarks apply more particularly to North-western America). Camping out is all very well, 'sleeping with no other canopy than the blue expanse' sounds very romantic and pretty, and generally 'lionises' the individual on his return who has done it; but no

one with a grain of experience would voluntarily sleep in the open air, if a tent was procurable. 'If you can't do what you like you must do what you can;' in the absence of canvas, a sky roof is about the only alternative.

Assuming a tent is available, the kind of tent I should strongly recommend is a 'gable end' or 'dog-kennel' *twelve-ell* tent, with a seven-foot ridge-pole, and two six-feet upright poles. The three poles should be joined in the centre with strong galvanised iron ferrules, so that they can be put together like a fishing-rod. One man, unaided, can with very little practice pitch such a tent in from eight to ten minutes, and peg it down.

Let me advise all travellers to carry their poles with them; trusting to the chance of cutting them is a bad plan, causing delay in pitching the tent. Poles are not always so very easy to find as the inexperienced may imagine, although travelling in the very midst of a forest; more than this, a tent is never so secure as when pitched with poles made on purpose. It is always better, too, to carry tent-pegs than trusting to cut them at the camping-ground; barrel-staves afford capital material for pegs.

Bedding.—A small horsehair mattress, three feet six inches wide, and six feet long. Two

blankets, a buffalo-skin, and waterproof wrapper to spread on the ground, and roll the bedding in when travelling, can be easily carried with a tent, and will be found very pleasant to sleep on at night or lounge on in the day. Great care should be exercised in packing up the bedding. Mules and horses often get a swim, or fall in fording streams, and rain frequently drenches one when least expected. If well rolled the bed should be impervious to water, and therefore safe against any accident from wet; finding soaked bedding on camping is enough to try the temper of a saint.

Tools.—An American axe and a three-inch auger are the only tools a skilled hand needs; with them he can build a log-house, or roof it, and add fireplace, chimney, door, and window; he can also make a raft, build a bridge, or hollow a cedar-log into a safe and shapely canoe. A strong case-knife, such as pork-butchers use, is by far the best kind of knife for general purposes. Worn at the belt, it is useful for everything, from mending a pen to skinning a buffalo or a humming-bird.

Cooking Utensils.—A frying-pan, small wooden pail, and tin pannikin. The former is equal to any emergency, for baking or frying; the

cup to boil coffee, make tea in, and drink from; the pail to dip water, and keep near the camp-fire ready for any purpose. A pail is also very useful to give your animals a drink, when the water is inaccessible to them from mire or rocky *cañons*.

Spare cloths should be carried in a round waterproof bag, made of strong canvas, painted (such as sailors use), in which notebooks and writing gear can be also stowed away.

For clothing I give the preference to good Scotch tweed, as a material better suited to stand wear-and-tear, and supply warmth without weight, than any fabric I have ever tried. Fur I abominate, as having no quality that is not immeasurably improved in a woollen fabric. Leather for jacket or trousers avoid as you would a rattle-snake, if you can by any possibility obtain other material. It shrinks when wet, shrinks when dry, feels cold at all times, and requires a week to dry if thoroughly soaked —a process that contracts the sleeves, if a jacket, from the wrist to the elbow, and trousers to knee-breeches.

Strong 'lace-up' boots, if you are provident enough to bring out a stock, are far and away the best foot-armature. Mocassins are only to be

tolerated in the absence of regular shoes and boots; they are as pervious to water as brown paper, and but scant protection against prickles and sharp stones. 'Skin-shoes' do very well for redskins, whose feet are as hard and tough as a saddle-flap; but take advice, and never forget a good supply of strong 'lace-ups' and a limp accommodating 'wide-awake.'

Firearms may be left entirely to the choice of the traveller: every man has his fancy weapon, and is ready at all times to do battle in support of its merits. To my taste a strong No. 12 double gun, smooth bore and to load at the muzzle, is by far the most useful gun for general purposes. Were I to enter into the respective merits of muzzle-loaders versus breech-loaders, the smooth-bore versus the rifle, I should only repeat what has been time after time discussed by the most able and experienced sportsmen. The choice of firearms I leave to my readers' tastes and inclinations.

Fishhooks of different sizes, gut, silk, and a piece of cobbler's wax, are absolute essentials; if you are angler sufficient to tie your own flies, fur and feathers are always obtainable. It saves a host of bother, to quietly sit down by the river-bank or camp-fire, and manufacture any insect

monstrosity you may deem most likely to 'kill.' Failing this useful accomplishment, take an assortment of flies with you; strong, rough, gaudy fellows I have always found most effective. Hair-line is best, if you are lucky enough to possess it, but stout cord will answer every purpose. Winch and rod are luxuries I always dispense with when travelling. I cut a stick to serve my purpose, and tie my line to the end of it; wind round the surplus length, fasten with a couple of half-hitches, and flog-away; if by chance a fish is hooked, too large to risk jerking out, play him as best you can, and leave the rest to luck and the strength of the tackle. A line equipped for immediate use I always wear twisted round my hat. In coming to a stream that looks enticing, I tether my horse, cut a rod, tie on my line, and go to work. If success rewards my efforts, I catch as many fish as may be needed, string them up, and wait for camping-time to devour my share.

As the *equipment* of mules and horses, provisioning, and systems of transport apply with equal force to many as to a solitary individual, it will save repetition, and answer every purpose, to describe the means we adopted in marking the Boundary line. Packing one or fifty mules re-

quires, in the packer or packers, an equal amount of skill.

As I have already said, a bell-mare is absolutely indispensable to a train of mules. A single mule can be tethered to graze; a train must be turned loose, and kept if possible from wandering by the bell-mare, which must be either tethered or hobbled. More than this, unless the train voluntarily followed the bell, no power on earth could drive them a yard when loaded. Pigs are models of passive obedience compared with mules; mules never, by any remote contingency, do right except by accident. The bearer of tea, tobacco, bedding, instruments (anything, in fact, spoilable) is pretty sure, if he has a chance, to fall or purposely roll in any water through which his route lies. Nine chances to one, when an early start is determined on, two or three mules are absent; and after hours of search and delay, the irate packers suddenly pounce upon them, or they come strolling back, whisking their tails and braying for the the bell, having been quietly snoozing or designedly hid in the bushes or sedge-plants close to the camp the whole time.

We had one small 'pinto' (spotted) mule, very good if anyone could only get on his back, and sit on it after getting there; when packed, his duty

was usually to carry the tent-poles. I am sure he knew, when thus armed, that mischief was in his power: no sooner was he loosed from the packers than he charged in amongst the thickest clump of mules he could see, running the sharp ends of the sticks into their sides, and sending the band right and left—paying off old grievances, I imagine. Colonel Hawkins (Her Majesty's Commissioner) once saw him turn a complete summersault, when the aparacjo was first synched on. With all their faults we could not do without them, and had patiently to put up with their oddities.

Pack-saddles of all sorts and patterns, that have any element of woodwork in their construction, I decry as worse than useless. The frame broken, your pack-saddle is done for; no mending will ever make it fit for use. It will work unsteadily on the animal's back; the load easily shifts, and a gall is the consequence that may take months to heal. We had a few 'crosstree' pack-saddles, made to begin with on the most approved plan and of the strongest materials, but abandoned them for the aparacjo, a Mexican invention, which I believe to be the very best contrivance ever made for packing freight of various kinds for transport on mule-back.

It requires a great deal of skill and long prac-

tice to pack and lash goods properly on to an aparacjo; but, believe me, the knowledge to a traveller is worth all the time and trouble it takes to acquire.

The great thing to accomplish in the construction of a pack-saddle is to avoid the use of wood, buckles, fixed lining, and stitching where any strain is required. An aparacjo is simply two large leather bags fastened together at the top: sew two bed-pillows together by the ends, stuff them tightly with hay, hang them across the back of a dog (or a chair will do), fasten them firmly with a wide canvas girth, imagine them to be made of strong leather, and you have an extemporised aparacjo before you.

The 'rigging' for a mule consists of—1. The Aparacjo, which varies in size from five feet in height or length to three feet six inches, the width being about two to two-and-a-half feet, the weight of an average-sized one being from thirty-six to forty pounds when dry, of course much heavier when wet. The value in California is about fifty dollars (10*l.*). 2. The Synch—which is a wide canvas girth with a leather strap at the end, that runs through a wooden eye or iron ring—should be one foot six inches wide, and about twenty feet long; its use is to fasten on the aparacjo.

3. The Sling rope, made of cord about the size of clothes-line, twenty to thirty feet long, according to the material to be packed; its use is to sling various packages, or casks, or boxes, in readiness for lashing. 4. The Riata, a strong rope sixty feet long, with which everything is securely lashed; by an intricate but admirable arrangement, this long rope, that has neither loop nor knot, so fastens the load that a mule rolling down a hillside can hardly displace it, a thing I have seen happen more than once. 5. The Sweat-cloth, a piece of canvas about four feet square, that goes next the skin. 6. The Blankets, four or five pieces, a little larger than the sweat-cloth. 7. The Corona, an embroidered cloth that goes between the aparacjo and blankets.

The packers know by the patterns embroidered on it to which mule the aparacjos belong. A blinder, to drop over the mule's eyes whilst being saddled and packed, always carried by each packer, also serves as a formidable whip, of which the mules have a wholesome dread; laggers in a train, unruly and careless 'mulos,' get switchings with the blinder they do not readily forget. A halter completes the equipment (technically styled 'the rigging') of a pack-mule. Each packer has a riding-mule; the cook always rides

the bell-mare in front of the train. Two packers to every six mules is a fair division of work.

Imagine a camp chosen with due regard to the three primary requisites—wood, water, and grass: breakfast over, bedding rolled up, tents struck and packed in the tent-bag, and the tinkling bell heralds the approach of the mules, being driven in by the packer whose duty it is to 'herd' them. Fifty come trotting in; the packers, blinders in hand, await their arrival, standing by the aparacjos, that are placed side by side in a kind of half-circle. The bell-mare seized on first, is haltered, and tied to the first aparacjo; then the mules file up, each standing with its head over an aparacjo; it sometimes happens to be the one it carries, mere matter of accident, not the choice of the mule on the score of ownership; they are not half so clever as that. The halters are then put on from the opposite side of the aparacjo, and each fastened to that of its neighbour. This saves counting; if the halters are all used, the mules are there to wear them.

Saddling begins immediately after haltering. Two packers loose a mule from its neighbour, find the aparacjo belonging to it, slip the blind over its eyes, adjust the saddle-cloths, *fling* on the aparacjo, and then 'synch up.' First one

packer, placing his foot against the poor animal to get the greater purchase, hauls with all his might, until one would fancy mule endurance had been taxed to its utmost limits. Not so, however: the other packer, who has been on the off-side steadying the aparacjo, now comes to aid his comrade; each this time places a foot against the mule's ribs, and, by their united efforts, nearly convert the beast into the shape of a dragon-fly; the lynch fast, the blind is slipped off and the mule turned loose to grunt, kick, plunge and roll, as best suits its temper.

When all are saddled, packing commences. The 'freight' is all piled in loads; under each load lays the riata or long lashing cord, on the load the sling-rope. To describe the manner of 'putting on' a load, and properly lashing it when on, is impossible. A month's daily practice is insufficient to make an apt scholar a moderately good packer. One may watch the mode of fastening the load with a riata for a year twice a day, and be no more able to do it at the twelve months' end than the flute could be learned by looking at another blow and finger it. Hence written description would be useless.

Packs adjusted, the *cook* starts on the bell-mare, the mules being carefully counted as they

string one by one after her. The packers, mounted, ride like field officers up and down the line of marching mules. When a pack slips, the mule is at once caught and the disarrangement readjusted. Extreme vigilance is needed whilst a train is on the march, lest a shifted load, or loosened lynch, causes a gall on the back of the mule; a half hour's negligence in this respect may render an animal useless for three or four months.

In provisioning the men employed on the line flour was found to be far better than hard bread, more portable, less liable to injury, and better relished than biscuit. Our men learned to bake capital bread, small iron ovens being part of each working parties' equipment. Baking-powder was also served out as part of the rations.

Salt pork and ration beef were carried in 100 lb. barrels, two barrels being a load for a light mule, or four fifty-pound sacks of flour. Two hundred and fifty pounds may be taken as a fair average load per animal for a train of mules.

Feeding the mules west of the Cascades was a most expensive and difficult affair. From the Chilukweyuk depôt to the furthest astronomical camp, fourteen days' journey for packed mules,

we had to feed the animals entirely on barley; so thick was the underbrush that it was impossible for the mules to get into it from off the trail.

If ten mules started for the far-away camps, five had to be loaded with barley, to feed themselves, and the other five packed with rations. The cost was enormous, as the grain had to be obtained from Chili, our consumption sometimes amounting to 1,000 lbs. per day.

This difficulty was greatly enhanced by the mosquitoes, the grass lands being so infested with these pests as to render grazing impossible. East of the Cascades we needed grain only in wintering, the timber being open and grass abundant.

It would take a volume to describe the cutting and marking the 'Boundary line.' The illustration drawn from a photograph of one of the camps, east of the Cascades, shows the tangle we had often to work in. The line is cut through the timber, from the coast to the eastern slopes of the Rocky Mountains; marked by an obelisk of faced granite at its commencement, then for a short distance by iron posts, the remainder by stone cairns placed at varying distances but in conspicuous places. The working staff was generally

from 120 to 150 men. But as all the details of this formidable undertaking will be published in the Commission report, it would be useless to give them in a work more particularly referring to the natural history of North Western America.

CHAPTER XI.

INDIAN DOGS.

THESE faithful animals, that cling to man through good and evil, are of the utmost importance to the native tribes inhabiting the Pacific and Atlantic sides of the Rocky Mountains. On the eastern slope, the Thickwood Crees, who occupy the country to the west of Lake Winnipeg and the northern boundary of the Saskatchewan, manage their transport with horses and canoes during summer, and in winter with dogs only.

In summer, dogs carry the loads on their backs on pads. In winter, the Indians travel on snow-shoes, and then harness the dogs to light sleighs, which they tug over the snow. A pretty sight it is in bright summer time, when hill and valley are alike clothed with a luxuriant vegetation, to see a train of dogs trotting along with their little loads, stopping continually to take a good sniff at some attractive perfume, or lap from a tempting

pool. Such idlers get constantly in rear of their comrades; the sharp crack of the Indian's whip recalling the truants to a sense of their indiscretion, they gallop with all their might to overtake the train; an undue haste, the usual result of which is to scatter the load along the trail. Then the culprits get a real taste of the thong, and are repacked. Every now and then they have a row, and, reckless of loads, roll one over the other, a very heap of dogs, all seeming to have an individual interest in the quarrel of any two. Sticks, whips, and kicks quell the riot; the packs again adjusted, on they trot.

In winter, when a trackless expanse of dazzling white extends in every direction from sky-line to sky-line, it is quite a picturesque sight and pleasant to witness a travelling party of Crees. The dogs, now harnessed to light sleighs (some of them made with runners, others simply a flat piece of board turned up at each end), jog after the men, who, shod with snow-shoes, stride along on the snow, as if it was hard ground; crossing lakes and rivers on the ice, impassable at other periods of the year. Each dog has usually a little string of bells round its neck, and as the bells are of different tones, the jingling music ringing clearly and sharply through the frosty

air, sounds as cheery and welcome as the song of the first migrant.

Other tribes in the Saskatchewan district (the Prairie Crees, for instance), instead of packing their dogs, use the 'travaille,' which is a triangle formed of two poles; the two smaller ends, fastened together, rest on the dog's shoulders, being kept in place by a leather strap fastened round the neck; a cross pole or two at the other end stretches them open and serves to make fast the load. This strange contrivance hauled along is better than packing, and available in the summer when there are not sleighs, but inferior to sleighing in winter, as dogs always work more cheerily when six or eight are harnessed together, than when each has its labour to perform singly.

This 'travaille' is also used by the Crees for their horses, when moving their lodges and camp equipment. It often happens that an old squaw and two or three naked little savages are perched along upon the back of a horse, with its 'travaille' and load, like birds upon a roost, the horse nearly hid by the poles and savages; the load and animal's head appear joined by a body composed of a clump of grotesque figures, their legs lost on the horse's sides. Coming suddenly upon such an apparition, amidst the

shadow of the silent forest, has often scared my horse, and for the moment startled me.

West of the Rocky Mountains I have never seen Indians use dogs for any system of transport; they either pack what they have to carry on the backs of horses, where canoes are not available, or failing either of these, the unfortunate squaws do the work of beasts of burden. The inland tribes use dogs solely for the chase and protection of their camps. Along the coast several tribes at one time kept dogs of a peculiar breed, having long white hair, that were annually shorn as we shear sheep, and the hair so obtained was woven into rugs, sometimes mixed with the wool of the mountain goat, at others duck feathers, or wild hemp, finely carded. Several of these most curious rugs are in the Ethnological room at the British Museum, visible to any who may be curious to see weaving in its most primitive form. I obtained them at different places along the coast. The simple machine or loom, if it may be so designated, used in weaving these rugs is also visible in the collection of the 'Economic Museum' at Kew.

It is a singular thing if these remote tribes discovered for themselves the art of weaving; for they knew and practised weaving dog-hair

fabrics before (as far as I know) they had intercourse with any civilised races. The art of dyeing the hair, and materials used with it, of different colours was also known to them, thus producing a regularly designed coloured pattern. Since the Hudson's Bay Company introduced blankets, the native manufacture has entirely ceased, and the dog from which the hair was procured is extinct or very nearly. Whence came this singular white long-haired dog, possessed by only a few tribes inhabiting the coast, scrupulously kept on islands to prevent their extending or escaping, and differing in every specific detail from all the other breeds of dogs belonging to either coast or inland Indians? There are two ways, it would appear, in which it is possible for it to have been imported. The more probable supposition is that it came from Japan; and I am informed by a friend who has been there, that the Japanese have a small long-haired dog, usually white, and from description very analogous to the dog that was shorn by the Indians of the coast and of Vancouver Island.

There can be little doubt that the Japanese visited the coast of North Western America long prior to any other people; whether accidentally wrecked, or designedly landing to trade with the

natives, is not by any means clear. Traditions still exist amongst the Indians, near the mouth of the Columbia, of strangers having once been amongst them, long before they had seen Europeans; and still more confirmatory of the story's probability, words undoubtedly of Japanese origin are still used in the jargon spoken on the coast called Chinook. If this is true, then I can see nothing very extraordinary in dogs having been on board the ship or junk visiting the coast, that they became the property of the natives, and that the art of weaving was learned from those who brought the dogs. More than this, the first possessors of these white dogs were, as far as it is possible to trace it, Chinook Indians, a tribe once very numerous, and living near the entrance to the Columbia river; thence the dog reached Puget's Sound, and eventually must have been carried to Nainimo across the Gulf of Georgia. Supposing it not to have been brought from Japan, the only other way it could have come must have been from the north, which is far from likely. That the dog was not indigenous, I am quite sure.

An immense variety of dogs are at present called 'Indian dogs,' but nearly all of them, wherever the Indians have been in trading com-

munication with whites, are either crosses with the native dog, or curs of various patterns brought by ships, emigrants, or fur traders.

The true Indian dog, as I have seen it in the Kootanie country, among the Spokans, and other tribes that have had no opportunity to cross the breed with any imported dog, is beyond all question nothing more than a tamed cayote or prairie wolf (*Canis latrans*); a most apt and appropriate name, for a greater thief does not exist. Although partially domesticated—by that I mean taught to hunt, come when called, and forsake their wild brethren—still they retain every type and character of the untamed animal. This animal, called a cayote, a name of Mexican importation, the 'italipus' of the Indians living at the Columbia's mouth, is not a true wolf.

This the Indians clearly know, inasmuch as the 'italipus' figures in every legend as being the animal whose form the bad spirit always assumes when doing evil and acting adversely to the good spirit. It seems to have taken a conspicuous place in the myths of the red man, utterly different from that of any other animal, and to be identified with his earliest history in a way that neither the true wolf or fox has ever been. The 'cayote' is to my mind a connecting

link between the wolf proper and the fox. Its appearance, colour, form of head, and habit of hunting in packs, are all characters that ally it to the wolf; but true wolves, as far as I have been able to investigate their habits in North Western America, invariably have their young in caves, clefts in the rocks, or any place where digging is unnecessary; whereas the cayote has its young in burrows, precisely in the same way as foxes. The voice, too, is compounded of the howl or bay of the wolf, and the snappish oft repeated yap, yap, peculiar to the fox.

Camping near the skirts of a forest on the Cascade mountains, in chilly autumn, when the days so far shortened make the evenings tediously long to one alone by the solitary camp-fire, I have lolled and listened to the gradual cessation of sounds, that, one by one slowly ceasing, are at last hushed without your being aware of it, dying off into perfect silence; as day with its blue sky fades into the purple twilight, and twilight leaves behind it a black vaulted expanse, gemmed with sparkling stars; changes that have no apparent beginning or end. Then amidst this darkness and silence the peculiar cry of the cayote bursts out as if close to your ear; ere one ceases another commences, then another, and

so on until the darkness, in which nothing is visible save bright luminous specs, like spheres of fire, seems crowded with cayotes. A child could frighten away the entire assembly of lurking thieves; they lack the courage to face man, even when in hungry packs; if disagreeably importunate and noisy, it is only necessary to take a burning stick, rush at the glittering eyes, and, helter-skelter, off they scamper for the thicket.

This most peculiar double voice begins with a deep-toned kind of howl, that, rapidly running up into higher barking sounds, trends off at last into a kind of scream or prolonged yell, issued in jerks. Every dog that the Indians have uncrossed by an imported breed in British Columbia has this voice, and I have often and often been deceived, mistaking the bay of an Indian dog for the cry of the cayote. Even now it would be puzzling to a naturalist, if visiting the interior of British Columbia, to trace the origin of the indigenous dog. As an instance of what I mean, my own dogs consisted of a Russian setter, obtained at Fort Rupert, originally from Sitka; a thorough-bred pointer, and a spaniel; beside these the men of the Commission had a bull-dog and a legion of nondescript curs. To my certain knowledge these dogs interbred in numerous in-

stances with native dogs. In many localities where this interbreeding took place, no record will remain of a pointer, setter, and spaniel having ever been there; the type of the bull-dog, too, will be impressed on succeeding generations. To what conclusion could any one arrive, with these facts hidden? Such is the present condition of all the Indian dogs along the entire extent of the north-west coast; one may find types representing every known variety.

At Sweltza, a small lake west of the Cascades, near which the Boundary line passed, I saw a little tribe of Indians that had a number of dogs, that were hardly in any degree altered from the cayote; more than this, they actually burrowed deeply into the ground to bring forth their young, and it was a common thing to see the puppies playing as young foxes do, at the entrance to the burrows, dashing into them like wild beasts on the slightest alarm. We had one of the puppies at our headquarters in Vancouver Island; a regular little wolf, but unluckily he got under a cart wheel, and was crushed to death.

The following specific characters of *Canis latrans* express with a few trifling exceptions those of the true Indian dog:—

Larger than the red fox, but not nearly so large as the grey wolf (*L. griseus*). Muzzle long, slender, and sharp pointed like the red fox. Eyes rather nearer together than are those of the wolf; colour of eyes, light brown; pupil circular. Ears long, triangular and erect, thickly clothed with hair except at the meatus, where they are quite naked. Feet long; the five pads on their under surfaces naked and black; a sixth, but smaller one, projects from behind the carpal joint. Four clawed digits on each foot, with a claw corresponding to the dew-claw in our dog attached to the rudimentary thumb. Tail bushy, tipped with white hairs, and half the length of the head and body. The general colour ochreous grey, much lighter on the belly than on the back and sides; the back viewed from head to tail looks black, as each hair is tipped with black, although the remaining part and under-fur is plumbeous.

The longer hairs on the neck, which the animal bristles up when angry, are tricoloured; the lower two-thirds reddish brown; then a ring of white, and a black tip, together giving a most curious speckled look to the neck of an enraged dog or cayote.

The most marked change observable from domestication is in the hair, which becomes shorter,

softer, and more uniform in coloration, although the tail retains its bushy appearance. Whether this alteration in the coat is due to the greater warmth of the lodges, I cannot tell; diet can have nothing to do with it, for the dogs live in the Indian lodges pretty much the same as cayotes do when wild.

I have given this brief description of the cayote's specific characters under the head of dogs, because, as I have endeavoured to show, my belief is, the dog, indigenous to British Columbia, is nothing more than a tamed cayote.

The Indians use them only for driving game. Putting a pack of the wolfish scrubby curs into a pine forest is like loosing so many wolves; away they tear, rushing up everything that comes in their way. If a puma or lynx is scared into a tree, the dogs at once surround it, and keep up the extraordinary double bark I endeavoured to describe, until the savages, who know that something is tree'd when they hear it, hasten to the spot and shoot the prisoner. Bears are generally either tree'd or driven to the rocks; surrounded by these snapping pests they take no heed of the hunters, who, stealing close up, kill them, without risk of attack.

Entering an Indian camp on foot, be it night or day, is really a risky thing to do. The prick-

eared guards swarm out from every lodge, like wasps from a shaken nest, and without any enquiry as to what your business may be, make straight at your legs, biting too in real earnest, if stick and toe are not vigorously plied, until the squaws, rushing to the rescue, lay on with lodge-poles, and release you from an imprisonment very desirable if practised on 'Ephraim,' * but very disagreeable to legs thinly trousered.

The dogs are fed in great measure on fish; the salmon that die, as described in Vol. I., afford a rich banquet to dogs, bears, wolves, and foxes. If, however, imported dogs are fed for any time on salmon, they get a kind of distemper, called by the settlers 'salmon sickness,' which is nearly always fatal.

The 'cayotes' and so-called dogs are both subject to a kind of mange, producing redness and irritability of skin, followed by loss of hair, and rapid wasting. I killed several cayotes, so bad from it as to be barely able to walk, and it as frequently kills the dogs. Whether this affection, clearly contagious, first arose among the dogs, and was by them given to the cayotes, or *vice versâ*, I was not able to discover. It is worthy of remark too, that the grey wolf never has it—

* Nickname for a 'Grizzly-bear.'

so say the Indians, and I certainly never saw it, although I have seen hundreds of skins. This induces me to attribute its origin to domestication; the tamed 'cayote' or dog, shunning the wolf, but interbreeding with the wild 'cayote,' thus propagated it.

CHAPTER XII.

THE NATIVES, THEIR CUSTOMS AND TRADITIONS.

WHENCE the native tribes originally came that people British Columbia and Vancouver Island I know not. We may suppose them to have come from the east, north, south, or west, write volumes in support of our pet theories, and argue for an indefinite time, after all to find ourselves just as we started. There they are; and that is about all we really know.

Their numbers, steadily decreasing, may be estimated at present as 30,000. The best division is into coast and inland tribes. The coast Indians are to a great extent dependant on the canoe, as the sole means of transport, the habit of sitting in which, continually, dwarfs and deforms the legs; add to this the custom of altering the form of the skull in infancy, and we account for the degenerate appearance of the coast savage when compared to the active horseman and hunter of the interior.

I can the better explain many of their customs by repeating some questions, and the replies to them, submitted by me to Dr. Tolmie of the Hudson's Bay Company's service, than whom there is no better authority on Indian customs and traditions, and to whose great kindness I am indebted for much valuable knowledge, and a hospitality the remembrance of which cheers one. Mr. Anderson, also late of the Hudson's Bay Company, kindly, at Dr. Tolmie's request, replied to many of my queries.

Question. The average size and weight (roughly estimated, or if practicable, by actual weighing and measuring) of the Nesqually Indians or the eight tribes speaking the Kliketat language?

Answer. (*Anderson.*)—Judging by the eye, I should say from 5 ft. 5 in. to 5 ft. 9 in.. Few would exceed the latter limit. They are by no means a large race of people. Weight probably from 130 to 150 lbs.

Q. The botanical names of the *Peu-hay* or bitter root; of *N'poolthla*; the *Mamun*, and *Siekywan*; also the *Calz*?

A. (*Anderson.*)—By the '*Peu-hay*' I presume is meant the *Spalt-lum* of the upper country. I have always regarded it as a mesembryanthemum.

Growing in the most arid localities, it flowers beautifully in early summer; but its foliage soon withers under the scorching rays of the sun as the season advances. The other 'bitter root,' the *Tra-chin* of the Carriers, is the bulb of the *Lilium Canadense*, flourishing in moist alluvial soils. I do not recognise the other varieties mentioned in this article under the names given.

Q. Have they any artificial way of modifying the form and appearance of the teeth?

A. (*Anderson.*)—No. At least not that I am aware of. Still they unconsciously do so. In the sandy districts the split salmon, in the process of drying, retains a portion of the comminuted sand driven by the winds. Hence in the process of mastication the teeth of the consumers are mechanically worn down. This to a transient observer might appear to be the effect of art, but it is not so. About the Dalles on the Columbia River (where, as you know, it is sandy enough) the natives before mid-age have the teeth worn nearly to the gums. Higher up, about Wallawalla and other places, the effect is not so conspicuous; not that the country is less sandy, but that the natives subsist more upon roots, and indeed have fewer salmon to eat. Among the Canadian voyagers of New Caledonia the same

effect is observable, and from the same cause. I give you a notable example, Theodore Larance, an old *habitué*, whom I dare say you know.

Q. Are Albinos found? The physical characters of their children, if they have any, or anything that can throw any light on their origin?

A. (*Anderson.*)—Yes, but rarely. There is now, or was recently, in this town a woman, a native of Milbank Sound, who is a true Albino. An unprincipled rascal from San Francisco attempted, under pretext of marriage, to carry off this unfortunate woman to California, where it afterwards transpired it was his intention to exhibit her as a show. The timely interposition of the authorities prevented this nefarious project. I know of one or two cases where the Albino condition was partially developed. You may recollect, after having read the work of Sir A. M. Kenrie, his having hired, near the mouth of the Westroad River, a young Indian, who afterwards guided him to the coast. This man, I may mention, *par parenthèse*, was still enjoying in my time in New Caledonia a green old age; and I need not say that whenever he visited my fort he was well received, as well for his grey hairs as for his fidelity to Sir Alexander. This old man, hale and hearty still in 1848, was

the father of a numerous family, all of whom were healthy save the eldest Coos-se-yea, who had assumed the chieftainship in place of his aged father, and who was nearly an Albino; that is, his face and body were marked in nearly equal proportions with huge blotches of livid white, contrasted with the tawny hue of the normal man of his race.

A. (*Tolmie.*)—The only Albino known of is the Ha-eel-tzuk or Milbank Sound woman, spoken of in Mr. A. C. Anderson's answer to Q. 4. She, as he states, is a true Albino, but is supposed to be a half-breed. Amongst the Hydah, or Queen Charlotte Island tribes, exist a family of coarse, red-haired, light-brown eyed, square-built people, short-sighted and of fair complexion. The oldest representative of this variety was twelve years ago an aged man, sixty or upwards, having all the above-mentioned characteristics well developed. In 1836 and 1837 I saw at Vancouver, on the Columbia River, a Chenook Indian, at least sixty years old, red-haired and with light-brown eyes. Brown-haired Indians of fairer than the average complexion are to be found amongst all the tribes from the Columbia River to Stikine in Russian territory, N. lat., 57°.

Q. Are there any ceremonies connected with the birth of a child, whether male or female?

A. (*Anderson.*)—None that I am aware of.

A. (*Tolmie.*)—Amongst the 'Sailish,' misnamed Flatheads, and the Kalleespelm, it was in primitive times the custom, amongst the wealthier families of a tribe, for the paternal relatives to present the mother on the birth of a child, with food, buffalo-robes and leather, such things as the child would need. The maternal relatives made return of clothing and other valuables, but not of food. Amongst the Shahaptain or Nerpercés the mother gave presents but received none in return.

Q. Does infanticide occur to any extent; if so, what are the probable causes?

A. (*Anderson.*)—No.

A. (*Tolmie.*)—Amongst the Chenooks and the Indians of Puget's Sound, as well as the Chimsians or Fort Simpson Indians, infanticide and causing of abortion are not uncommon. Certain old women at Nesqually I knew were reputed experts at the last-mentioned business. The causes are, at first, shame at having a child without an acknowledged father; latterly, the desire of

unmarried women not to be hampered with children.

Q. In dressing and cradling children, do they compress the forehead or flatten the occiput, or adopt any methods by which other parts of the body may be affected?

A. (*Anderson.*)—No; at least not perceptibly.

A. (*Tolmie.*)—The Indians from Columbia River to Milbank Sound inclusive flatten the forehead; also the Yakimas and Kliketats or Whulwhypum amongst the tribes of the interior, speaking the Walla-walla language, otherwise known as the Kliketat. The north-western tribes from Milbank Sound to Fort Simpson, and perhaps farther north, compress the vertex or crown so as to flatten that part of the head. The Sailish, Kalleespelm, &c., in dressing an infant, leave the head, shoulders and hips uncompressed. They bandage the waist and legs with the view of producing a broad-shouldered, small-waisted, and straight-limbed adult.

Q. What the average size of families, and are births of more than one child common?

A. (*Anderson.*)—I cannot state the average. Twin-births are rare, however, in my experience.

Q. To what age do females continue to bear children, and how long do they suckle them?

A. (*Anderson.*) —Probably from 40 to 46. It is hard to arrive at the ages of Indians, male or female. 2nd. Sometimes from two till three years.

Q. Is chastity cultivated or defective?

A. (*Anderson.*)—Among the interior tribes chastity is a virtue. Among the fish-eaters of the north-west coast it has no meaning, or if it has it appears to be utterly disregarded.

A. (*Tolmie.*)—Amongst the interior tribes, in primitive times, breaches of chastity on the part either of married or unmarried females were often punished with death, inflicted either by the brother or husband. Amongst the fish-eating tribes of the rivers and coast chastity was less esteemed. A vast deterioration in this respect has taken place amongst all the Indian tribes since the influx of whites amongst them.

Q. What are the ceremonies and practices connected with marriage?

A. (*Anderson.*)—Interchange of presents chiefly and a purchase-money accruing to the father of the bride. Among certain tribes a kind of ap-

prenticeship is exacted, in hunting or otherwise, from the bridegroom.

A. (*Tolmie.*)—The suitor does not court, but when he has made a selection he sends his mother or aunt to the damsel with a proposal, to which she made no reply. The parents are then referred to, and should they have consented, the suitor watches for the damsel at the accustomed watering place and proposes to her. The consent being given, the suitor, accompanied by his friends, dressed in their best, and driving loose horses, goes to the parents' lodge. They then strip off their fine clothes, obtaining old ones in return, and allow the bride's friends to select horses from the *band* driven up. Soon after, the bride's friends, arrayed in their best, carry the bride on a robe to her future husband's lodge, and exchanging there their good clothes for old ones, leave without making any return for the horses received. Should the woman be badly used by her husband she is taken home by her mother or aunt, the father and brothers scrupulously avoiding interference. Interchange of presents is the invariable rule, a preponderance going to the bride's parents. At Milbank the ceremonies, which are tedious, are performed on a platform resting on

two canoes afloat, and surrounded by canoes of participants and spectators.

Q. Is polygamy permitted, and is divorce ever tolerated?

A. (*Anderson.*)—Polygamy is universal, regulated simply by the facilities for subsistence. Divorce is on the principle, as among all barbarous tribes, of *stet pro ratione voluntas*. But then the danger of objections on the part of the relatives is imminent.

Q. How are widows treated?

A. (*Anderson.*)—A rigid mourning is exacted amongst most tribes, except along the northwest coast, where frequently the females are dominant and exercise the privileges of chieftanship.

A. (*Tolmie.*)—If the Sailish widow behaves well she is treated well by the mother-in-law. In about two years, or when her shorn locks regain their wonted length, her mother-in-law points out the relative of the deceased she ought to marry; should she consent she is still regarded as a relative, but in case of refusal she is turned out of doors and deprived of all the deceased's property.

Q. Are they long or short-lived?

A. (*Anderson.*)—A hard question to answer. Instances of extreme longevity are, however,

very rare. As a general rule I think the scriptural limit is rarely exceeded.

Q. Have they any contagious disease, or any endemic disease, or goître, pelagra, plica, and the like?

A. (*Anderson.*)—Goître does not exist on this side of the rocky mountains. On the Saskatchewan and Pine River it is common.

A. (*Tolmie.*)—No goître known west of the rocky mountains.

Q. How do they generally dispose of the dead; and are implements, articles of clothing, food, &c., &c., deposited with the dead?

A. (*Anderson.*)—Among some tribes by burning, among others by burial in the ground, or depositing in canoes or boxes above the surface. Offerings are frequently deposited about the places of sepulture, and sacrifices of horses (and where slavery exists, of slaves) are made.

A. (*Tolmie.*)—The Indians dispose of their dead by interment or burning, or in canoes placed on trees, or rocks, according to the nature of the country. The carrier Indians of New Caledonia, and the Chimmesyans on the coast, and other tribes speaking their language, burn the dead. In New Caledonia, at the burning, the widow in

former days was thrust into the flames and severely scorched when the body of her husband was being consumed. She afterwards had to carry his ashes in a bag on her shoulders for two years, during which period she was the servant or drudge of his relatives. Thereafter the ashes of a chief were placed in an ornamented box or urn, which was never suffered to touch the ground, being fitted to rest on the end of a pole, stuck in front of the lodge occupied by the relatives of the deceased person. The other tribes in New Caledonia bury their dead. The carriers held triennial feasts in honour of deceased heroes, when the manly acts of the departed were rehearsed to the assembled guests. Women occasionally presided at these feasts.—Sailish. Along with Indians of note were interred the weapons they had used, buffalo robes, and the pipe and hat used by deceased; also a bundle of mocassins. At the burial of a Sailish chief the ceremonies were curious; the bravest woman of the tribe, one used to carrying ammunition to the warrior when engaged in fight, bared her breast to the person who for courage and conduct was deemed fit successor to the departed. From the breast he cut a small portion, which he threw in the fire. She then cut a small piece from the

shoulder of the warrior, which was also thrown into the fire. A piece of bitter root, with a piece of meat, were next thrown into the fire, all these being intended as offerings to the Sun, the deity of the Flatheads. The war pipe was then smoked by the assembled multitude, and thus the ceremony ended, except in cases where horses were killed. The burying of the hat was a great affair, there having been attached to it a piece of red cloth, six inches wide and six yards long, adorned with ermine skin, fringed with the wing feathers of the rocky mountain eagle, and having the tail as its appendage. When scouting in the immediate neighbourhood of the enemy, a Blackfoot or Flathead chief would ride at full gallop so near the foe as to flap in their faces the eagle's tail streaming behind, yet no one dared seize the tail or streamer, it being considered sacrilegious and fraught with misfortune to touch it. The chief was often shot during these Balaklava gallops, when a contest would ensue for the body and gaudy gear, such as, if all tales be true, once occurred on the plain of Troy for the body of Patroclus. At Nesqually I have known the remains of several bodies of relatives disinterred at different places, washed and re-enveloped in

blankets, &c., after which they were again buried in one grave.

Q. Is there any subsequent visitation of the dead? whether are they disposed of separately or in conjunction with other bodies?

A. (*Anderson.*)—Yes, by the widow mourning for her husband, the husband for the wife, or the parent for the child. Human nature, whether under a tawny skin or a white one, is equally the same.

Q. What is the received idea respecting a future state? does it bear the character of transmigration, invisible existence about their accustomed haunts, or removal to a distant abode?

A. (*Tolmie.*)—The Indian notions of a future state are, as far as I have been able to learn, dim and indistinct, but that they have notions of the kind is evidenced by the placing of bundles of mocassins in the grave as if for a journey, and the killing of horses, and of slaves, on the coast, to accompany the deceased. The Flatheads (Sailish and Kalleespelm), it is said, believed the Sun to be the Supreme Being, and that after death the good, *i. e.* the brave and generous, went to the Sun, while the bad remained near the earth and troubled the living; others

supposed that the worthless ceased to exist at death.

They believed, along with the Nesquallies, Yakimas, and as far as I know all the tribes, that beasts, fishes, and, at least, the edible roots of the vegetable kingdom, were once human beings. The Flathead tradition is that the son of the Sun came to the earth and compelled all these humans to swim across a lake of oil, on emerging from which they assumed their present forms, a reason being given for the particular shape and peculiarities of each. Bear, beaver, goose, &c.; for instance, the bear crossed by diving, and is therefore fat; the goose did not dive, and consequently has only fat on the neck and behind.

Q. Can the origin of their dogs be traced whence came the parent stock?

A. (*Tolmie.*)—With the Flatheads and Chimsyans, the tradition is that the son of the Sun was accompanied by a dog, when he came upon the earth. The latter do not say that the metamorphosis of humans into beasts was caused by the son of the Sun.

Q. Are the chiefs, whether of limited or absolute power, elective or hereditary?

A. (*Anderson.*)—Hereditary rank goes a great

way, but riches generally carry the palm. Instance: Lolo of Kamloops, formerly a scullion, now a so-called chief.

A. (*Tolmie.*)—The authority of the chiefs is limited, and depends greatly on individual force of character. On the coast, chiefship is hereditary by the female line. In the interior (Kliketat tribes and Flatheads), rank passes by the male line, but courage and ability are the best recommendations to leadership amongst the tribes encountering the hostile Blackfoot every summer in the buffalo-country.

Q. Have they any laws? If so, how are they preserved? How is delinquency punished and how are judges constituted? What are the crimes taken notice of by the laws? Is there gradation or commutation of punishment?

A. (*Anderson.*)—Yes, *i.e.* Social Laws, which as a point of honour are generally well observed. Any dereliction is generally remedied by the *ultima ratio.*

A. (*Tolmie.*)—No law but custom. Very troublesome characters sometimes shot by agreement between a few leading men in a tribe. Medicine men the most frequent victims of this and of individual vengeance. They frequently avert further evil by returning fees when the

patient dies, or by large payments when accused by a dying man of having caused his illness. Rival practitioners get rid of each other by practising on the credulity of dying persons as to the originator of their ailments. Murder is oftener settled by payment of property to the victim's relatives than by retribution, yet occasionally retaliation ensues after a settlement.

Q. Approximately the number of inhabitants? Has the number sensibly varied, and within what period? if so, from what causes?

A. (*Anderson.*)—The population is perceptibly on the decrease.

Q. Have they any mode of commemorating victories, by monuments, or hieroglyphics?

A. (*Anderson.*)—Not apparently, at least to me.

Q. Have they any sacred days or periods, any order of priests; if so, are they hereditary, elective, or determined by any particular circumstance?

A. (*Tolmie.*)—The Flatheads offered sacrifices to the sun on every solemn occasion, and the chief presided.

Q. Is there any idea of an order of inferior spirits, *i. e.* of ghosts, fairies, &c., &c.; of magic, witchcraft, or second sight?

A. (*Anderson.*)—They have.

A. (*Tolmie.*) — Their mythology is ample,

though little known, and their tales endless of the 'olden time,' when the animals and fishes were human and gifted with speech. They believe in the return of the dead, in second sight, and very strongly in necromancy or witchcraft; hence their intense dread of powerful medicine men. It was formerly the custom for young men to seek supernatural gifts by seclusion in the wilderness and fasting. Some thus became successful hunters, gamblers, traders or hunters, as the gift might be, whilst to the more crafty and ill-disposed was vouchsafed the frequently fatal gift of imposing on their fellows the belief that they were 'medicine men' or conjurers.

Q. Have they any distinction of stars or constellations?

A. (*Anderson.*)—The hunting tribes, like the Chaldean of old, are keen observers, and the order of the principal constellations is well observed by them in a rude way.

A. (*Tolmie.*)—They have names for several of the constellations.

Q. How do they divide time with reference to the year?

A. (*Anderson.*)—Chiefly by the natural order of the seasons. That is, when the crane appears in its northward flight, the goose, the ripening of

the different berries, the arrival or spawning of the different fishes, &c., &c.

A. (*Tolmie.*)—They divide the year into seasons denoted by the opening of vegetation, the ripening of different wild fruits, the coming in season of roots and of fish, the fall of the leaf and the setting in of winter.

I subsequently wrote to Dr. Tolmie to obtain for me a vocabulary of the Nesqually dialects, and at the same time requested him to give me the results of his valuable knowledge relative to the eight tribes speaking the Kliketat language. I insert the letter the Dr. was good enough to favour me with in reply, as it contains such highly valuable information:—

'Nesqually, March 14, 1859.

'My dear Mr. Lord,—

'With the best possible intentions, it was out of my power to get the vocabulary, &c., ready for the departure of the "Otter," and as time now presses I will at once plunge *in medias res* names of tribes speaking the Kliketat language, or dialects thereof, with statement of the district they each occupy.

'1. Whulwhypum, wooded and prairie country between Vancouver and the Dalles, W.T. (Wascopam) base of Mount Hood.

'2. Tait-inapum. Base of Mount St. Helens, and headwaters of Cowlibz and Lewis rivers.

'3. Pishwanwapum (Yakima). Yakimaw, or Eyakema on Arrowsmith's map, valley.

'4. Walla Wallapum. Walla-walla River and neighbourhood.

'5. Wy-eilat (or Kyoose). Country running to the south of Walla-walla.

'6. Umatilla. Umatallow R. (Arrowsmith) and country extending thence westward to Dalles.

'7. Peloose. Entrance of Great Snake River and surrounding country.

'8. Wyampam. Falls of the Columbia above, and near the Dalles.

'I cannot give the numbers of these tribes, but would say at a venture, that in all they could not turn out more than 2000 able-bodied men. In former times, prior to the advent of whites, the Whulwhypum used to plunder and kidnap the Chinooks of the Columbia River, whose country extended from the Dalles to the ocean; and the Pishwanwapum, better known by the name given them by the Colville Indians, "Yakimaw," did the same to the Nesquallies, Puyallips, and other tribes dwelling on Puget's Island. By the Chinooks, the Whulwhypum were called Kliketat,

and by the Puget's Sound Indians the Yakimaws are called "Stobshaddat," both words signifying robber or plunderer. On Puget's Sound the term is likewise applied to any Indians out on a raid. As the Whulwhypum dwelling on the prairies to the east and north of Vancouver became first known to the whites—the Hudson's Bay people of Vancouver—as "Kliketats," as the term was euphonised, so this name has of late been applied to the language, and to all Indians speaking it.

'The Kliketats—the term is used collectively—being excellent hunters, had within the last quarter of a century extended themselves throughout the Walamet valley and as far southward as the confines of California, becoming rich by supplying the American settlers in these countries with venison and horses. The Kliketats, although getting the upper hand of the aboriginal owners of these new hunting grounds, did not settle permanently therein, but in small parties were continually revisiting their native lands. In 1854, the territorial government of Oregon compelled these Indians to return to their homes, and withdraw permanently from southern Oregon, where their presence was annoying to the settlers. In 1855 they were treated with for the sale of their lands, which gave rise to the Indian war of

1855-56, in which the Kliketats bore a principal part.

'Prior to the war of 1855, the Kliketats had many horses. Some chiefs, such as Peopeomuse-muse, counted their hundreds. The tradition is that horses were obtained from the southward, and that the Kliketats have not been for many generations in possession of them.

'In their own country, the Kliketats lived on salmon, and to no great extent by the chase, game being scarce. The principal root used by them as food is the peahay, a bitter root which has an "elegant" bitter taste, and boils into a farinaceous jelly; next is the n'poolthla, which they grind into flour; again, the "mamun" and seek-ywa, which they knead into white cakes and use as biscuit; these also have a bitter flavour; lastly, the kamass, formerly Scilla esculenta, but now "kamassia," I believe. The "calz"* which you saw here is also used as food by the Kliketats. They used, before the war, to cultivate potatoes and maize, and some of the chiefs had horned cattle.

'I have never been able to find that the Indians of North West America, Kliketats or others, had

* Calz, a kind of wild sun-flower, the root of which is dried in the sun, and then consumed as an esculent.

originally any form of worship. They have, however, still a belief in familiar spirits in Chinook, "Tamanowash," whom they address when in difficulty. They consider that supernatural aid, or 'Tamanowash,' may be obtained for five objects, namely, the cure or infliction of disease, skill in hunting, and in gambling, courage, and invulnerability; lastly, success in the acquisition of property.

'A youth desirous of obtaining "Tamanowash" must adhere to strict cleanliness of person, and must abstain from sexual intercourse, as indispensible preliminaries; he must also leave the parental lodge of an evening and sleep by the shore of some distant and lonely lake, or in some other secluded place, night after night, until during sleep the Tamanowash communicates with him. By this way of acting, on returning to the lodge in the morning the parents know whether or not the son has been successful in his night's quest. Either the ambition of the sire, the son, or of both, will prompt to perseverance in trial. It is an Indian belief that when an Indian dies, or is killed, his Tamanowash passes to his son.

'Some say they have a grizzly bear as Tamanowash, others a woodpecker, the invulnerables an oak, and so on *ad infinitum*.

'Most of the Kliketats flatten the forehead, but not so much as the Chinooks or Puget Sound Indians do. I am decidedly of opinion that the flattening of the cranium has no injurious effect on the adult brain. Infants undergoing the process occasionally suffer, when undue pressure has been applied.

'The Indians of the present day have learnt the whiteman's belief in a future state of existence beyond the grave, and the more reflecting seem to accept it with great satisfaction. When asked why the practice holds amongst them of burying property with the dead, and killing horses and even white slaves over the graves, the reply is that they follow the customs of their forefathers, who they think must have had a glimmering belief in a future state, and wished the property, &c., to be with the deceased wheresoever placed.

'I should at an earlier stage have mentioned that the Wyeilat, or Kyoose, are considered for the numbers as the most formidable and warlike tribe of the interior, save the "Flatheads," living east of Colville, and who do not flatten the head. These Wyeilat are not properly Kliketats, but interlopers to the southward, it is supposed; their original language now almost extinct, as the

elders die off, having affinity with that of the carriers of North Caledonia and the Umpqua Indians of Southern Oregon.

'I must now conclude this very hurried epistle, which I should have taken more time about had you not desired to have the vocabulary ere the departure of the "Princess Royal."

'I am, my dear Sir,

'Very truly yours,

'W. F. TOLMIE.

'John K. Lord, Esq.'

An illustration attached to this work represents three Spokan Indians, photographed at Fort Colville. The celt made of flint, also figured in the illustration page, the finest mounted specimen at present in the British Museum collection, I obtained from the Indian on the left side of the group. They had no history of it further than that it was of great age, and had been handed down from chief to chief for many generations.

The skulls* are drawn from three at present in the British Museum collection. The one altered, from circular pressure, was the skull I obtained at Fort Rupert; the flattened skull is

* Vide illustration: An Indian Burial Ground.

from Vancouver Island; the unaltered one from Fort Colville. The system of flattening the head has been so frequently described that it is almost unnecessary to repeat it here. The cradle is figured from one in the British Museum collection, with the board arranged for making the pressure. The 'baby-jumper' is a very simple contrivance; a stick, springy like a fishing rod, is stuck obliquely into the ground with a string attached to the end of it; when the baby cries from the pain caused by the pressure, the mother hangs the cradle to the end of the stick, then jerking the string keeps up a bobbing motion that appears to lull and sooth the little sufferer to sleep. I quite agree with Dr. Tolmie in thinking altering the head in no way detracts from mental capacity; it only alters the shape of the box, it does not lessen its size. The various systems of hunting and fishing are already given in describing animals, and how fish are captured by Indians.

The illustrations are drawn from photographs. The one with two figures* represents a pure-blooded Indian, one of the Flathead tribe, who be it remembered do not in any way alter the form of the skull. The Flathead is the figure seated;

* Vide illustration: Two Indians photgraphed at Fort Colville, a pure Indian and half-breed.

the other standing is a half breed, an employée of the Hudson's Bay Company; his father was a French Canadian, his mother a Cree squaw.

The illustration in which there are three figures represents three Spokan Indians;* one, the figure to the left, has a stone celt, which I obtained; it is now in the British Museum collection, and deemed the finest specimen they possess. There was no record as to how it became his property, all I could glean respecting its history was that for a long period it had been handed down from father to son as a valuable heirloom; hereditary inheritance I find with Indians, as with whites, is weak to resist the all-potent dollar. The centre figure holds a rifle, which was not his own, but borrowed from Macdonald, the chief trader, for the occasion. The figure on the right has a bow and arrow, both of which were also purchased. The Indian bow is a masterpiece of skilful manufacture; its elasticity does not in any way depend on the wood used in its construction, but on the elastic ligament, procured from the fore leg of the elk; this is affixed to the wooden framework of the bow by a kind of glue made from the skin of the 'white' salmon, a glue when hardened resisting the influence of wet to redissolve it.

* Vide illustration: Three Spokan Indians.

This elastic back to the wood acts as would an india-rubber band; the bow when bent takes an arrow about a yard in length, which it propels with a force equal, for a short range, to that of a rifle bullet. When an Indian shoots, five or six arrows are held in the left hand, and as the string, which is made of tendon, is hauled back, the right hand brings with it an arrow; this one fired, another arrow is seized, and as rapidly as one could reasonably count, the six arrows held in the left hand are discharged. Had I my choice of weapons I should much rather encounter a savage armed with a trade gun than with a bow and arrows. Spare arrows are carried in a quiver made from the skin of their medicine animal, or 'Tamanowash.'

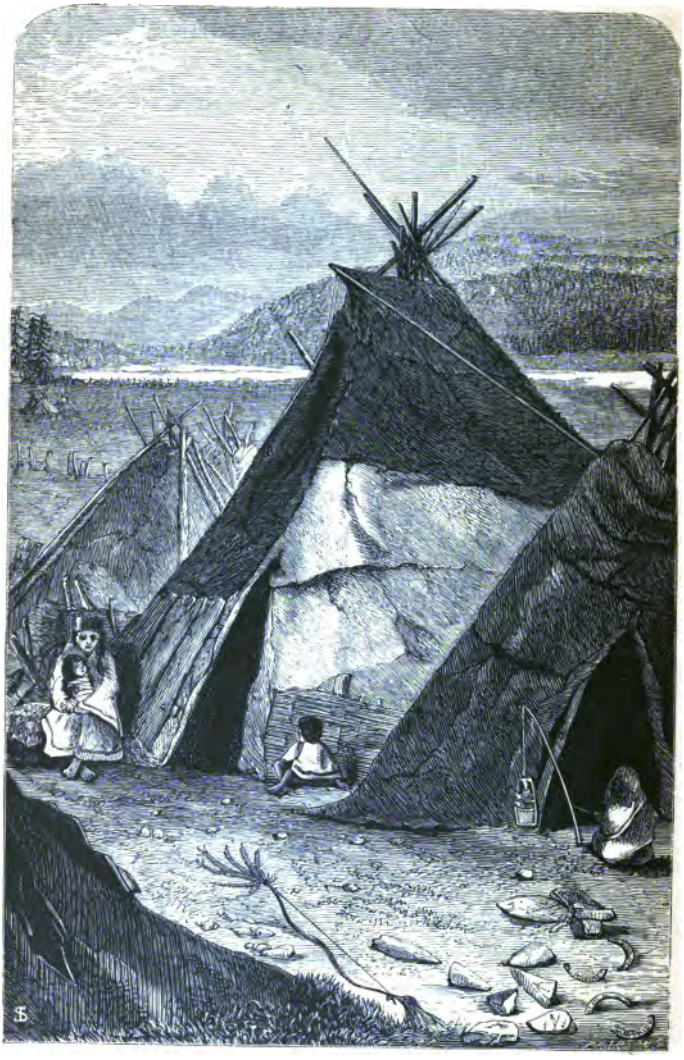
Flint heads for the arrows were once exclusively used, but since the Indians have acquired a knowledge of iron they employ it in preference to stone. But the trade gun has now in a great measure superseded the use of the bow and arrows.

Their lodges and canoes differ very much. The coast tribes live generally during winter in large sheds made of plank; three or four sheds often contain a whole colony, and constitute an Indian village. These sheds are before des-

cribed in the trip to Fort Rupert. They use lodges, or in other words, conical tents, when fishing and moving from place to place, during the summer; these lodges generally consist of poles covered with mats. The Sumass and Chilukweyuk Indians frequently use rush mats; the rushes are harvested, and brought from long distances, then carefully dried in the sun; when dry they are sewn together with long needles made of hard wood varying in length from six feet to four inches, threaded with cord twisted from the smaller rushes; mats thus made are perfectly rain-proof. The coast Indians usually cover their summer lodges with mats made from the inner bark of the Cedar (*Thuja gigantea*). These mats are platted together and exactly resemble bas, or matting, as it is usually called.

In platting the bark they manage to produce very beautiful patterns to ornament their mats; and as different tribes adopt each a pattern of its own, an Indian can readily tell to which tribe any particular mat belonged. Specimens of the rush and cedar bark mats are in the Indian collection of the British Museum, brought home by myself.

The inland tribes, as a rule, live winter and summer in lodges; some of the poorer tribes use



INDIAN LODGES.

rush mats, but the wealthier ones have the skin lodge shown in the illustration.* These are by far the best lodges used. The poles are covered with the skins of either deer or buffalo, sewed together with tendon, and the top is constructed to move round in accordance with the wind, thus avoiding the blinding effects of the wood smoke. The fire is placed on the ground in the centre of the lodge, and the inmates squat round it, or when sleeping arrange themselves like the spokes in a wheel, their feet to the fire and their heads towards the sides of the lodge. A good skin lodge is worth 50 dollars, 10*l*. The reader will get a clearer idea of the rush and skin lodge by comparing the lodge shown in the sketch of Symukwateen with the three shown in the illustration 'Indian Lodges.'

The canoes also are of various kinds; the canoe used by the Kootanies, described in a preceding chapter, is the general form of the bark canoe employed on all the rivers inland; on the coast and up the Fraser River the canoes are all dug-outs, that is, made from a solid piece of wood hollowed and shaped to the desired pattern. The Fraser canoe has the bow and stern different to the canoes used by the Van Island Indians. These again

* Vide illustration: Indian Lodges.

differ from the Nianimos as the Nianimos differ from the Fort Rupert, Queen Charlotte Islanders, and the various coast Indians.

Making a 'dug-out' requires great skill and patience. She must float evenly, be right in her lines, not too thick or too thin, and bilged at the sides to give breadth and sufficiency of beam. A small kind of steel adze is used nowaday, but in old times the Indians had only stone implements or tools, and with these managed to chop down trees, hew them into planks, and make canoes ('dug outs') as they make them now in the iron age. When the canoe is hollowed and shaped, it has then to be widened at the sides. This the savages ingeniously accomplish by first filling the canoe with water, then plunging red-hot stones into the water until it reaches to near the boiling-point; then sticks are forced in betwixt the sides, and the canoe allowed to cool; a second time the process is repeated, and so on again and again, until the desired expansion is accomplished.

I saw canoes at Fort Rupert ('dug outs') seventy feet long, that would carry thirty fighting men over a moderately rough sea as safely as a boat. The canoes and paddles are all painted with bright colours, red predominating; the device being generally the 'arms,' if I may so express

it, of the tribe. Some use an eye, others an eagle's head, others a frog; indeed, nearly every tribe adopts some rude heraldic symbol, but for what purpose I could not discover.

When staying at Fort Rupert I saw, by mere chance, what the Hudson's Bay trader called an 'Indian copper.' He told me that it was only on very high festivals that it was ever produced, and that its value to the tribe was estimated to be 15 slaves, equal to 200 blankets.

This wonderful 'medicine' was contained in a wooden case, most elaborately ornamented on its exterior with differently-shaped pieces of nacre neatly inlaid, brass-headed nails, and pieces of bone. The inside was lined with the softest kind of cedar-bark. The 'copper' was 2 feet 4½ inches in length, wider at one end than the other, the wider end 1 foot 6½ inches; and brilliantly painted, representing all sorts of curiously-shaped devices; interspersed amongst them were eyes of all sizes. It was made from a solid piece of native copper, that had been hammered flat. The trader also told me that some imitation 'coppers' had been made for the Company and offered to the Indians, but nothing would induce them either to purchase or have them as a gift. What use this 'copper' is I cannot tell, unless it is a kind

of standard similar to our regimental colours. It belongs to the tribe, not to the chief, and is kept by the 'medicine-men' or doctors, rain-makers, and scoundrels in general.

Not the least curious of the Coast Indian customs is that of masking. Imitations of the most hideous monsters conceivable are carved for masks from cedar-wood, and by a clumsy arrangement of strings these masks are made to roll the eyes, and open and shut the mouth. They use them when dancing, the only music a kind of drum or tambourine, hung round with the beaks of the sea-parrot, which rattle as the instrument is shaken and beat. Some cover their heads with swans-down, and as they bow to their partner, small portions fly off and settle on him; and this sending the down upon the opposite dancer is considered the great skill of the performance.

The Bella-hoo-la Indians, a tribe that resides on the banks of the Salmon river, make very beautiful baskets from the fine roots of the cedar; they also make hats and watertight vessels from the same material. The baskets are called *Zeilus-qua.*

The Indian cradle (*Spat-zun*) is made from cedar. Immediately after birth, the infant is subjected

to the process of flattening the head; a pad or compress is first put on the forehead, then bandaged tightly. The baby during this process is strapped into the cradle; a long timber pole placed obliquely, one end being fixed firmly in the ground, serves to hang the cradle on. Thus suspended, the child is kept continually jumped, by a string fastened to the lower end of the cradle and tugged at by a squaw. This primitive baby-jumper evidently lulls the poor little sufferer, the victim of an absurdly barbarous fashion. This pressure is continued at intervals until the child is able to run about. Other tribes make the pressure round the head, and thus elevate the vertex or crown so as to resemble a sugarloaf.

At their festivities, the Fort Rupert Indians use a most curious drink, which is thus prepared. They gather the berries of the vaccinium in the summer, before they are quite ripe, and press them into a firm cake about half an inch thick; this is carefully dried in the sun, and wrapped in bark. When this cake is to be used, about five ounces of it are placed in a large vessel, and a small quantity of cold water added. It is then stirred rapidly round and round with the hand, which must be perfectly free from grease, squeezed, and worked into a pastelike form; then more water is

added, and the rapid stirring continued. It now begins to look exactly like soapsuds, and the more it is worked about the more frothy it becomes. In this frothy state it is drank. All who intend indulging in this foggy-fuddle come armed with immense wooden spoons; then they ladle and drink, until, nearly bursting, they shamble off to the water, a drink of which appears to allay the distention this fuddling occasions. I have often tasted it, but cannot say I like it; it has a disagreeably bitter flavour, suggestive of physic; and though stirred with a female hand, still the idea of dirt is so associated in my mind with Indians, that I could never get over the feeling that the fingers might have been previously used for other purposes, and the process of washing them forgotten. The dog's-hair blankets I have described in the chapter on Dogs.

The 'Indian Burial Ground' (*vide* illustration) was drawn from a photograph. The huge figures, carved from solid trees, are placed round the boxes in order to keep away evil spirits; small tin vessels, pieces of coloured cloth, the skins of small animals, and all kinds of odds and ends, are hung by the relatives of the dead on the boxes containing the body. One thing they never fail to do—that is, to bore the bottom of the tin cups or vessels

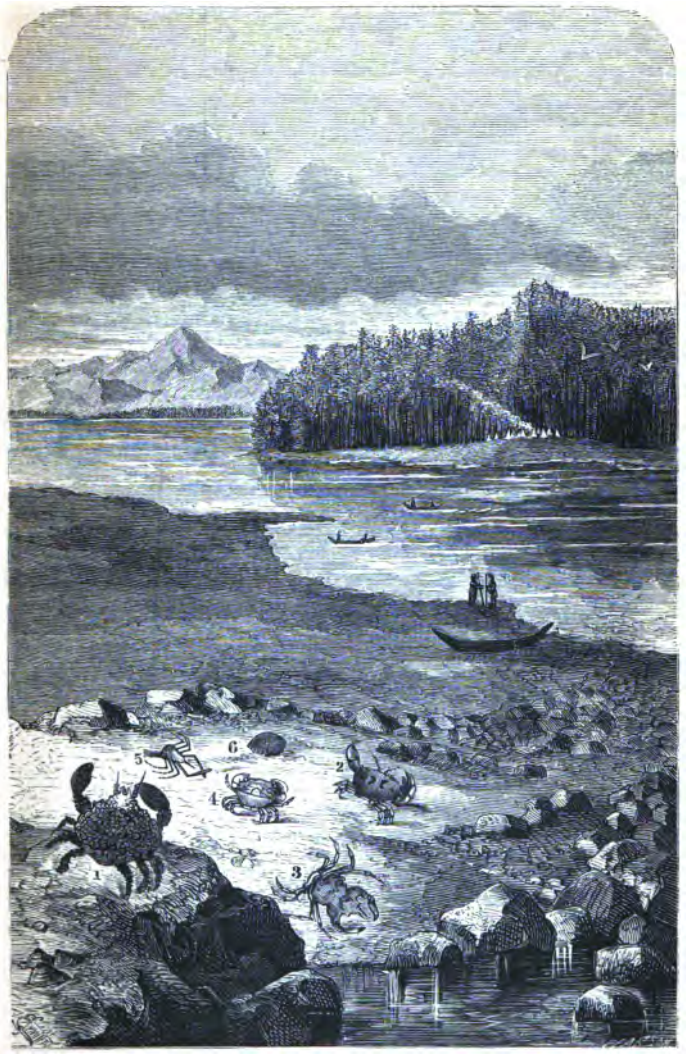
full of holes: thus rendered useless no one will steal them. Scattered on the ground are flint implements once used by the Indians, and the three skulls before spoken of. The one to the left is that of the chief, brought from Fort Rupert (*vide* trip to Fort Rupert, Vol. I.), showing the effect of circular pressure; the middle one is an unaltered head from the Upper Columbia; whilst that on the left shows the effect of flattening the forehead.

CHAPTER XIII.

DEPARTURE FROM FORT COLVILLE—VANCOUVER ISLAND CRABS.

We left Fort Colville in April. The snow was still on the ground, and everything very sloppy and wet. During the winter grain was taken out in sleighs, and distributed at different stations along the route. This enabled the Commission to start much earlier, as the mules by this arrangement were not dependant on grass. We followed the same course on our return as we did on coming up, a route already described. At Walla-walla we transferred all the mules and horses to some persons to whom the Commissioner had sold them, embarked in the steamer, reached the Dalles—thence the Cascades, Fort Vancouver, and Portland, from which place the ocean-steamer took us to Vancouver Island to await shipment to England. I added many things to my collection during this time, amongst them a variety of crustaceans (*vide* illustration).

On my return I submitted them to Mr. Spence



VANCOUVER ISLAND CRABS.

Fig. 1. Petalocerus bicornis.
„ 2. Chlorodius imbricatus.
„ 3. Pugettia Lordii.
Fig. 4. Platycarcinus recurvidens.
„ 5. Oregonia longimana.
„ 6. Cryptolithodes altafissura.

Bates, F.R.S., who named and described the new and other species; I append the report he very kindly sent me.

(The new species of crustaceans, collected on the east side of Vancouver Island, were some of them dredged in from eight to ten fathoms water; the rest were collected between tidemarks).

Mr. Spence Bates says, in speaking of the collection generally:—'The extremely opposite and varied localities in which many of the species here represented have hitherto been found, suggest the idea that Vancouver Island corresponds with the extreme limit between a northern and a tropical fauna. It is only in this way I can account for finding the representatives of tropical species with others that are found only (on the eastern coast of Asia) in the Arctic and, perhaps, North Atlantic Oceans.' That he is quite correct in this assumption I think there can be no doubt; for not only does it apply to the crustaceans, but with equal force to all the molluscous groups. Several new species of shells, collected at the same time and in the same localities as the crustaceans, which were named and described by Dr. Baird, with appended notes by myself, and published in the Zoological Society's Proceedings for the year 1864, are

identical in some cases; in others closely allied to known species from Japan, Australia, and the shores of our own island.

The tidal irregularities of this coast are perfectly inexplicable. In May, June, and July, during the twenty-four hours, there is but one high and one low water. At the change and fall of the moon, high-tide happens near midnight, and varies but little as to time during these three months. In August, September, and October there are two high and two low tides in the twenty-four hours. Then in the winter months (November, December, and January) the regular twelve-hour tides recur; but highwater is at twelve o'clock in the day, instead of twelve at night. The spring-tides range from ten to twelve feet, the neaps from five to eight.

The temperature of the sea, taken during the summer months near the surface, ranges from 52° to 56° F. The sea-water seldom, I may say never, looks clear, but always presents a turbid muddy appearance, as if a large quantity of sand was mixed with it. This may in some measure be accounted for by assuming that strong undercurrents flow from north to south, and sweeping past the island, and being (from their low specific gravity) close to the bottom, stir up sand and

mud. The sea-bottom in and adjacent to the numerous bays, harbours, and long canals—which, like the fiords of Norway and Sweden, everywhere intersect the mainland and inland coasts—varies in accordance with the character of the bounding rocks: where trap, soft clay slates, or felspathic rocks form the coast-line, a thick blue clay is the usual bottom; where grit and sandstones, there it is sandy.

Little, if indeed anything, is as yet known of the deep-sea productions from the west side of the Island, which will afford a rich harvest to future explorers.

PUGETTIA LORDII, N. S.—Carapace quadrate behind the orbits; the anterior portion abruptly narrowing, and produced into a double rostrum, the horns of which divaricate. The anterior extremity of the orbital margin is produced to a sharp point—that is, elevated slightly above the beak; the posterior extremity is defined by a distinct fissure. The anterior hepatic region is produced by a tooth immediately posterior to the postorbital fossa, laterally extended to an obtuse tooth or point, and posteriorly separated from the branchial regions by a decided fossa or lateral constriction. The branchial region is laterally produced to a strong anteriorly-curved

point. The dorsal surface is tolerably smooth, exhibiting but faintly the markings of the internal viscera. The eyes are small, and reach but little beyond the orbital margin. The external antennæ have the first joint fused with the carapace, the second and third compressed and arcuate, and terminate in a smooth flagellum.

The first pair of pereiopoda are moderately long, having the meros triangulate, the upper angle forming a prominent carina, that extends along but terminates abruptly a little short of both extremities of the joint; the carpus is tricarinated; the propodos is laterally compressed, and forms about half the length of the limb, and is about one-third its breadth. The dactylos is slightly curved and slightly serrated on the inner margin, and antagonises at the extremity with the produced propodos. The second pair of pereiopoda are nearly as long as the first, but much more slender, having the meros and propodos subcarinated. The three posterior pairs are shorter. The pleon is small and narrow, the second and third segments being the broadest; while the seventh is abruptly narrower than the sixth, and forms a triangular plate. The female differs from the male in being more protuberant over the stomachal region, and consequently the ros-

trum is more depressed; anteriorly, there is less development of the lateral branchial teeth, and there is a relatively greater distance between the fifth pair of pereiopoda. The pleon is almost circular, and covers the entire surface of the ventral region.

The colour of the animal is of a reddish-brown, which increases in brightness as it approaches towards the extremity of the chelæ. In one or two young females the carapace was smooth and glabrous.

Found in tolerable abundance in Esquimalt and Victoria Harbours, and, indeed, in all the sheltered inlets along the mainland coasts from the mouth of the Fraser to San Francisco. Dredged in about eight fathoms of water, but easily obtained in pools at extremely low tides. Its favourite haunt is under a large flat stone, or hid under the seaweed that fringes the margin of a pool. The specimen from which the drawing was made was taken in Esquimalt Harbour.

SAYAS LYRATUS (DANA). N. S.—Explor. Exp. p. 86, pl. i., fig. 1.—From the Straits of Georgia, U. S.

OREGONIA LONGIMANA, N. S.—Pereiopoda prima in longitudine bis carapacis.

Carapace coarsely granulated or minutely tuberculated, free from hairs, except upon the

rostrum, which is slender, and twice the length of the interorbital space. Pleon in the male narrow, concave upon each side, corresponding with the fourth, fifth, and sixth segments. Telson rather broader than the preceding segment, and emarginate at the terminal extremity. The first pair of pereiopoda are very long, being twice the length of the carapace, and much longer than in either of the species described by Dana and Stimpson. The meros reaches quite to the extremity of the rostrum, and is furnished with two or more longitudinal rows of small granulated tubercles; the propodos is rather longer than the meros, and its breadth is equal to about one-third of its length; the dactylos is about one-third the length of the propodos, slightly curved, and minutely serrated on the inner margin, which impinges throughout its entire length upon the produced extremity of the propodos. The three succeeding pairs of pereiopoda are imperfect in the only specimens procured, but the last pair are long, cylindrical, slender, and terminated in a powerful dactylos.

This crab was obtained in Esquimalt Harbour, and in its habits and general distribution are very similar to the preceding.

OREGONIA GRACILIS (DANA).—Sill. Am. Jour. Sec. 2, x. Taken in from eight to ten fathoms water, in Esquimalt Harbour, Straits of Georgia.

OREGONIA HIRTA (DANA).—Sill. Am. Jour. Sec. 2, xi. p. 270. Straits of Georgia, U. S.

CANCER PRODUCTUS (RANDAL).—Esquimalt Harbour.

PLATYCARCINUS RECURVIDENS, N. S.—Dentes anterioris lateralis regionis habens novem recurvos et granulatos.

This very pretty species may easily be distinguished by the sharp points of the inner lateral teeth, granulated or minutely baccated along the margin, and having the apex recurved. The intraorbital margin is three-lobed and granulated, the centre lobe being the smallest. The dorsal surface of the carapace is granulated on the prominent lobes in the larger specimens, but almost smooth in the young. The first pair of pereiopoda have also lines of granulations along the outer surface of the propodos and carpus.

Dana has merged this genus into that of *Cancer*, but the greater length of the animal in relation to its breadth is a very convenient generic diagnosis, and one that appears to correspond with Milne Edwards' description relative to the more longitudinal position of the two pairs of antennæ.

The specimens were obtained in Esquimalt Harbour. It frequents pools between tide-marks;

and it is common everywhere along the Oregon and Vancouver Island coasts.

ERIPHIA GONAGRA (EDWARDS).—Hist. des Crust., folio 1, p. 426. Esquimalt Harbour.

PANOPŒUS CRENATUS (EDWARDS and LUCAS).—Esquimalt Harbour.

XANTHO DISPAR (DANA).—Esquimalt Harbour.

XANTHO BELLA (STIMPSON).—Esquimalt Harbour.

CHLORODIUS IMBRICATUS, N. S.—Anteriorem regionem carapacis habens imbricatam irregulariter; posteriorem planam; carpum et propodon pereiopodum paris primi rugosa.

Carapace having the posterior portion smooth, the anterior being rough with flattened prominences, that form an irregularly imbricated surface. Anterior margin five-toothed, the central tooth being the largest, the posterior the most prominent. A small secondary tooth stands upon the anterior surface of the fourth and fifth teeth. The first pair of pereiopoda are short and robust; they have the carpus deeply corrugated upon the external surface; a slight rib is also present upon the carpus of each of the four succeeding pairs of pereiopodos.

Only a single specimen of this pretty little species was obtained. It was dredged in about eight fathoms of water, in Esquimalt Harbour.

OCYPODE URVULII (GUERIN).—Esquimalt Harbour.

GRAPSUS LIVIDUS (DANA).—Esquimalt Harbour.

HEMIGRAPSUS SEDENTATUS (DANA).—Between the tide-marks, Esquimalt Harbour.

Dana records it from the island of St. Lorenzo, at Peru. It is remarkable for the great speed with which it runs across the dry sands to escape capture.

GELASIMUS ANNULIPES (EDWARDS).—Esquimalt Harbour.

Dana records it from Singapore, East Indies, and Mr. Edwards from the Indian Sea.

PINNOTHERES FABA (DANA).—Esquimalt Harbour, recorded by Dana from Puget's Sound.

CRYPTOLITHODES TYPICUS.—Brandt, Bull. de l'Acad de St. Petersbourg, 1849, vii. 175; Stimpson, Crust. et Echin. of Pacific North America; Journal of the Boston Soc. of Nat. Hist., vol. vi. p. 472, pl. 20.

A specimen of this species, which was first described by Brandt, and afterwards more fully, as well as figured, by Stimpson, was taken in Rosario Strait, Vancouver Island, as well as in Upper California.

The male, which has not hitherto been described, differs from the female in being less produced posteriorly. The posterior margin, instead of being projected in an arch inversely

corresponding with that of the anterior margin, traverses a line that is nearly direct from side to side, slightly posterior to the points of the broadest diameter in the carapace. The pleon is triangular, and smaller and narrower than in the female, having the lateral margins more straight and symmetrical.

The only male specimen in the collection is smaller than the female, and the surface generally more tuberculated. The right propodos of the first pair of pereiopoda is larger than the left, and is so well developed as scarcely to be capable of being folded within the limits of the carapace. The length of the male animal, from the extremity of the rostrum to the centre of the posterior margin of the carapace, is about three-fourths of an inch; its breadth, from the point of one lateral extremity to the other, is about one inch and a quarter. The size of the largest female in the collection is in length about one inch and a quarter, and breadth about two inches.

CRYPTOLITHODES ALTA-FISSURA, N. S.—Fœmina Carapax est dorsaliter lævis; rostrum quadratum; oculorum alvei altæ-fissuræ ex utra parter ostri; sunt pleon ex læva propodis par primus subæqualia et lævia cum carinâ supra dactylos.

This species may readily be detected from the two previously known by the smoothness of the carapace, propodi, and pleon, and more distinctly by the deep orbital notch on each side of the rostrum.

The carapace is nearly as broad again as long, and produced considerably, posteriorly to the cardiac elevation, a feature that appears to belong to the female.

The rostrum is broad, flat, and rectangular. The antero-lateral margins are produced so far anteriorly as to be nearly in a line with the extremity of the rostrum; a deep notch, in which the eyes are situated, exists on each side of the rostrum. The anterior margin is slightly marked with distant small points; the posterior margin is quite smooth and even. The dorsal surface is quite smooth, and pencilled in light red upon a yellowish ground, the red pencilling being fine and delicate, following the contour of the margin and surface of the carapace.

The pleon is subsymmetrical and very smooth, and planted considerably within the posterior margin of the carapace. The second segment (first visible) has the marginal plates fused with the central. The sixth segment is without lateral plates; and the telson is situated beneath

and anterior to the posterior extremity of the sixth segment.

The eyes are small, and placed upon peduncles, that gradually taper from the base to the extremity. The first pair of antennæ are short, and developed upon the type of those of the brachyura; but the first joint is reduced to a size that is only about twice the diameter of the second. The second pair of antennæ are but little longer than the first, and are furnished with a broad round scale at the third joint, and a terminal flagellum, that is about the length of the fifth joint of the peduncle. The squamiform appendage is circular and dishlike; the inner margin is straight, or somewhat excavated.

The second pair of gnathopoda have the third joint much broader than the fourth (the secondary appendage reaches not to the extremity of the third), and have the terminal joints small and rudimentary. The first pair of pereiopoda are subequal in the female, the propodos upon the right side being somewhat larger than on the left; the surface is smooth and even, and the dactylos is furnished with a prominent carina, that terminates abruptly near the basal articulation, and loses itself gradually towards the apex. The fifth pair of pereiopoda are completely

hid from view; the three basal joints are short; the two terminal ones subequally long, and furnished with a copious brush of strong cilia. These appendages are folded together and enclosed within the branchial chambers, where they, no doubt, fulfil the office of the flabella of the highest forms of crustacea; affording an interesting illustration of an organ being converted, by the force of circumstances, from its original purpose to the fulfilment of another, for which it was apparently most unsuited.

PETALOCEROS BELLIANUS (WHITE), Proc. Z. S. 1856, p. 134.—Between tidemarks, Esquimalt Harbour.

PETALOCERUS BICORNIS, N. S.—Rostrum in duo cornua divisum habens.

Carapace triangular, anteriorly produced into two horizontal hornlike processes, tuberculated with nodulated prominences all over the surface, but furnished with a series of large tubercles corresponding in a line with the external margin of the carapace; the antero-lateral margin, constricted between the branchial and hepatic regions, furnished posteriorly to the orbit with two strong blunt processes, and posteriorly to the central constriction; armed laterally with two distinct narrow processes, and posteriorly with six closely-situated large round tubercles.

The pleon is nearly symmetrical, being rather larger on the left than the right side. Each segment is defined by a marginal prominence; that upon the left side is continued from near the middle to a process that terminates in a point or tooth at the side; but that on the right becomes confluent with a posterior ridge, and forms an irregular circle, the centre of which is deeply depressed.

The eyes are small, of a green colour, and surmounted on denticulated peduncles. The first pair of antennæ consist of three equal-lengthened joints (of which the first is more robust), together with a short, stout, pilose flagellum, and a slender secondary appendage. The second pair of antennæ have a compound scale, consisting of two large and two short compressed processes, and the third joint is furnished with two or three sharp strong processes. The first pair of pereiopoda are chelate and strong, echinated with blunt-pointed spines, and terminate in fingers that are flattened at the extremity, and furnished upon the outer surface with numerous tufts of hair, that spring from the summits of the numerous tubercles that are found there. The second, third, and fourth pairs of pereiopoda are more slender than the first, resemble one

another very considerably, and are furnished with short, sharp, and slightly-curved dactyli. The fifth pair of pereiopoda are rudimentary appendages; they consist of but five joints, the last of which terminates in a blunt extremity, that is furnished with a considerable brush of hair, and is probably used for the purpose of cleansing the branchial appendages.

The pleopoda are present in the female, with the exception of the first pair (which are small), only upon the left side of the pleon, as exemplified in our specimen.

This species differs from White's *P. bellianus* in having a horizontal bifurcate rostrum to the carapace, being more distinctly tuberculated, and in the pereiopoda being more strongly spinated.

This handsome species is of a yellow colour, picked out with purple between the tubercles.

It was dredged in Esquimalt Harbour, in ten fathoms of water.

ECHIDNOCERUS CIBARIUS (White).—Victoria and Esquimalt Harbour.

PORCELLANA EDWARDSII (Desausure).—Esquimalt Harbour. M. Verreaux obtained it at Magellan.

PORCELLANA EUPICOLA (Stimpson).—Esquimalt Harbour.

Mr. Stimpson says that the members of this remarkable genus are the largest crabs known:

they do not, indeed, cover so much space as do many of the *Maiacæ* with their extended legs; but their carapax is nearly as large and their weight greater than even the *Macrocheira* of Japan. Specimens have been taken the weight of which exceeded seven pounds; the diameter of the carapax is over ten inches.

EUPAGURUS PERLATUS (EDWARDS).—Esquimalt Harbour. Dana records it, from Callao, Peru, and Chili.

EUPAGURUS ARMATUS (STIMPSON).—Esquimalt Harbour.

CENOBITES DIOGENES (EDWARDS). *Vide* vol. ii.

CLIBANARIUS LINEATUS (DANA).—Esquimalt Harbour.

CLIBANARIUS TURGIDUS (STIMPSON).—Six fathoms water, in Straits of Feuca.

CRANGON VULGARIS.—Esquimalt and Victoria Harbours.

ASTACUS KLAMATHENSIS (STIMPSON).—In all streams east of the Cascades.

HYPPOLYTE ESQUIMALTIANUS, N. S.—Rostrum longius quam carapacem habens; quatuor dentibus supra armatum juxta basem et septem infra; quatuor posterioribus junctim locatis; tertium segmentum pleonis posteriore productum habens.

Rostrum as long as the carapace, armed with four teeth at the base; the posterior being just behind the orbits, and the anterior being near the centre of the rostrum; the anterior half of the rostrum being straight and smooth. The inferior margin is excavate at the base, and furnished with seven small teeth; the four posterior being near together and posterior to the centre of the

rostrum, the three others being further apart, the most anterior being subapical.

The third segment of the pleon is dorsally produced posteriorly to a point. The eyes are small: the superior antennæ have the primary ramus of the flagellum tolerably robust, and reaching to about two-thirds the length of the rostrum; the secondary slender, and longer than the primary. The inferior antennæ have the scale reaching to about three-fourths the length of the rostrum, rounded at the apex, subapically furnished with a small tooth upon the external margin: the flagellum wanting.

First pair of pereiopoda short, robust, chelate; second pair long, slender, and chelate; the posterior terminating in a robust dactylos.

Taken in Esquimalt Harbour.

HYPPOLYTE BREVIROSTRIS (DANA). — Esquimalt Harbour.

HYPPOLYTE LAYI (OWEN).—Esquimalt Harbour,—at Monterey, by Captain Beechy.

PANDALUS DANÆ (STIMPSON).—Esquimalt Harbour.

GEBIA PUGETTENSIS (DANA).—Esquimalt Harbour.

CALLIANASSA LONGIMANA (STIMPSON).—Puget's Sound and Straits of Feuca.

ALLORCHESTES VERTICELLATUS (DANA).—Eight fathoms water, in Esquimalt Harbour.

Dana took it along the shore near Valparaiso.

ALLORCHESTES BREVICORNIS (Dana).—Dredged in six fathoms water, in Esquimalt Harbour.

Dana records it from the Bay of Islands, New Zealand.

MŒRA FUSCA, N. S.—Antenniarum superiorum secundum articulum pedunculi non longiorem quum primum habens; flagellum et pedunculum subæqualia; gnathopodum par secundum cum propode magno palmam edentulatum habens; periopodum posterius pares marginem posteriorem non serratam.

The body is long and slender; the superior antennæ are about half the length of the animal, the peduncle being scarcely longer than the flagellum; the secondary appendage being half the length of the primary, the second joint of the peduncle being about the same length as the first. Second pair of gnathopoda having the propodos large; palm without teeth, and defined by a small pointed process; posterior pair of pereiopoda having the posterior margin of the base smooth.

In its general appearance this species bears a near affinity to *Mœra grossimana*, as well as to *M. tenella*, from the Feejee Islands; the only appreciable distinctions being in the shorter length of the second joint of the antennæ, the absence of teeth from the palm of the hand in the second pair of gnathopoda, and in the even margin of the last (the only remaining) pair of pereio-

poda, and perhaps also in the shortness of the peduncle of the ultimate pair of pleopoda.

Only one specimen of this species is in the collection; and that was taken from a sponge dredged in about ten fathoms of water in Esquimalt Harbour. It is of a brownish colour.

AMPHITHOE PEREGRINA (DANA).—Esquimalt Harbour.

Dana records this species as living amongst the roots of floating fucus, at sea, thirty miles south of Valparaiso.

AMPHITHOE ORIENTALES (DANA).—Esquimalt Harbour.

It is also recorded by Dana from Tongatabu, in the Pacific, along shores of coral in shallow water.

AMPHITHOE FILICORNIS (DANA).—Esquimalt Harbour.

It differs in no essential character from the specimen to which Dana has given the specific name, and which he obtained at Rio Janeiro.

IDOTEA WOSSENESSKII (BRANDT).—Esquimalt Harbour.

Dana records it from San Francisco; it has also been taken at Atcha and Sitka Sounds by Wossenesskii, and at Puget's Sound by Dr. Suckly.

IDOTEA MEDIA.—Esquimalt Harbour.

IDOTEA STRICTA (DANA).—Esquimalt Harbour.

JŒRA WAKISHIANA, N. S.—Posteriorem marginem pleonis habens bis excavatum cuspide intermedia supra cuspidatos margines non producta; antennæ inferiores non possunt extendere supra quintum segmentum; pereionis posteriora pleopoda non longiora quam posteriori margo latus est.

Anterior margin of the cephalon nearly straight; pereion having the sides subparallel, the greatest width being at the sixth segment; pleon having a double excavation on the posterior margin, the central point not extending beyond the extremity of the sides. Superior antennæ reaching to the extremity of the fourth segment of the inferior; inferior antennæ nearly two-thirds of the length of the animal. Posterior pair of pleopoda as long as the posterior margin of the pleon, terminating in two styliform rami, each of which is tipped with a few short hairs.

This species was taken from a sponge dredged in about eight fathoms of water in Esquimalt Harbour.

The specific name is derived from the circumstance of the animal having been found on the territory of the tribe of Wakish Indians.

TANAIS LORICATUS, N. S.—Exemplum imperfectum; inferiores antennas semi-breviores quam superiores habens; gnathopodum primi paris propoda ovata dactylo breve et tumido; pereiopodum primis tribus articulis brevibus et latis sunt, loricis ad pereionem adherentibus.

The only specimen in the collection is imperfect. The first segment of the pereion appears to be imperfectly fused with the cephalon; inferior antennæ scarcely half the length of the superior. First pair of gnathopoda having the propodos ovate; dactylos short and tumid, shorter and less pointed than the digital process of the propodos. Pereiopoda having the first three joints short and broad, being affixed to the side of the pereion like plates of mail (hence the specific name); they terminate in short pointed dactyli, and have the propodi armed with two lateral rows of strong black pointed teeth.

This species was taken from the hollow of a sponge dredged in Esquimalt Harbour, at the depth of about ten fathoms.

IONE CORNUTUS, N. S.—Mas: pleonem terminatum rotunde.

The male differs from the description of the European species, chiefly in having the caudal extremity terminating obtusely, and in having shorter antennæ.

Fœm., subequilateralis, lateralia cornua cephalonis habens recurvata, pleopoda longa et arborea.

The female has the antero-lateral hornlike process of the cephalon curved posteriorly. The pereion is not quite equilaterally developed. The

coxæ of the four anterior pairs of the pereiopoda are round, and all attached to the antero-lateral margin of the segments of the pereion. The coxæ of the three posterior are the larger, and produced posteriorly to a point. The pleopoda are long, and fringed with arborescent branchiæ.

This is the only species known, besides that taken by Colonel Montagu on the southern coast of England.

Length, male, $\frac{1}{4}$; female, $\frac{3}{4}$ of an inch.

Taken attached to the branchia of *Callianassa longimana*.

My mission in North-western America is ended. The Hudson's Bay Company's steamer 'Labouchere' takes us to San Francisco, where we spend a very pleasant week, and I meet with many old friends, whom I had encountered mule-hunting. The mail-steamer takes us to Panama, where we have to remain a short time, to await the arrival of the English steamer at Colon. Panama has been so often described, and is so frequently visited nowadays, that any description of mine would be a repetition of what others have better said.

I will content myself by saying we reached home safely and in admirable health. If I have

been successful enough to combine instruction with amusement, and when the reader puts down the 'Naturalist in North-western America,' after going through its pages, he can say he knows more of that country's Natural History than he did before, I shall have accomplished all my most sanguine anticipations.

APPENDIX.

APPENDIX.

A List of Mammals, Birds, Insects, Reptiles, Fishes, Shells, Annelides, and Diatomaceæ, collected by myself in British Columbia and Vancouver Island, with notes on their habits.

New species, together with those possessing any novel interest, are described in Vol. I. or II.

HERE I think is the proper place to acknowledge the obligations conferred on me by the following gentlemen, without whose valuable aid I could not have determined and described the new species obtained :—

To Dr. E. Gray, first, for immense assistance conferred in his public capacity, and great kindness shown me in his private one.

To Mr. George Gray (British Museum), for valuable help in making out the birds.

To Dr. Baird (British Museum), for description of the new species of shells and annelides, and other valuable help as regards the molluscous groups.

To Mr. Smith (British Museum), for great assistance in determining, naming, and arranging the insects;

and to Mr. Walker, for naming and describing the Coleoptera.

To Dr. A. Gunther (British Museum), for descriptions and much valuable aid in making out the Salmonidæ and other fishes collected.

To Professor Bowerbank, F. R. S., for very great kindness in determining and describing two sponges new to science.

To Spence Bates, Esq., for descriptions of the new Crustaceans.

To Mr. E. W. Smith and Mr. Whymper I am indebted for the able illustrations in Vols. I. and II.

List of Mammals.

INSECTIVORA.

Sorex Trowbridgii. (Baird.)
— Suckleyi. (Baird.)
— vagrans. (Cooper.)
Urotrichus Gibsii. (Baird.)
Scalops Townsendii. (Bach.)

FELIDÆ.

Felis concolor. (Linn.)
Lynx canadensis. (Raf.)

CANIDÆ.

Canis occidentalis.
— Grisco albus. (Richd.)
— rufus. (Richd.)
— llatrans.
— familiaris.
Vulpes macrourus. (Baird.)
— discussatus.
— argentatus.

MARTINÆ.

Mustela Pennantii. (Erxl.)
— americana. (Turton.)
Putorius noveboracensis. (De Kay.)
— longicauda. (Bonapt.)
— Vison. (Ard. & Bach.)
Gulo luscus. (Ard. & Bach.)

LUTRINÆ.

Lutra californica. (Gray.)
Enhydra marina. (Licht.)

MELINÆ.

Mephitis occidentalis. (Baird.)
— bicolor. (Gray.)
Taxidea americana. (Baird.)

URSIDÆ.

Procyon lotor. (Storr.)
Ursus horribilis. (Ord.)
— cinnamomeus. (Ord.)
— americanus. (Ord.)

RODENTIA.

Sciurus Hudsonius. (Pallas.)
— fossor. (Peake.)
— Douglassii. (Bach.)

Sciurus Richardsonii. (Bach.)
Pteromys Oregonensis. (Bach.)
— alpinus. (Richd.)
Spermophilus Townsendii. (Bach.)
— Douglassii. (Richd.)
— Richardsonii. (Sabine.)
— Parryii. (Richd.)
— lateralis. (Tay.)
Tamias quadrivittatus. (Say.)
— Townsendii. (Bach.)
Arctomys pruinosus. (Gmelin.)
— monax. (Linn.)
— Okanaganus. (King.)

CASTORINÆ.

Aplodontia leporina. (Richd.)
Castor canadensis. (Kuhl.)

GEOMYINÆ.

Thomomys Douglassii. (Richd.)
— Umbrinus.

SACCOMYINÆ.

Perognathus monticola. (Baird.)

DIPODINÆ.

Jaculus Hudsonius.

MURINÆ.

Mus rattus. (Linn.)
Hesperomys austerus. (Baird.)
Hesperomys leucopus. (Leconte.)
— Boylii. (Baird.)
Neotoma cinerea. (Ord.)
Arvicola Oregoni. (Bach.)

FIBER.

Fiber Zibethicus. (Cuvier.)
— Osoyoosensis. (Lord: *sp. nov.*)

HYSTERICIDÆ.

Erethizon epixanthus. (Brandt.)

LEPORIDÆ.

Lepus californicus. (Gray.)
— campestris. (Bach.)
— artimesia. (Bach.)
Lagomys princeps. (Richd.)
— minimus. (Lord: *sp. nov.*)

CERVINÆ.

Alce americanus. (Jard.)
Rangifer caribou. (And. & Bach.)
Cervus canadensis. (Erxl.)
— virginianus. (Bodd.)
— leucurus. (Doug.)
— columbianus. (Richd.)
— macrotis. (Say.)

CAVICORNIÆ.

Antilocapra americana. (Ord.)
Aplocerus montanus. (Ord.)
Ovis montana. (Cuvier.)

List of the Birds, with notes of habitat and periods of arrival and departure.

Raptores.

Cathatis aura	Vancouver Island, and throughout British Columbia.
— californianus	Mouth of Fraser River. Seldom visits the interior.

Falco nigriceps	Sumass Prairie.
— columbaris	Vancouver Island, and throughout British Columbia. Migratory.
— sparverus	Common in British Columbia. Winters on Vancouver Island.
Astur atricapillus	Lake Osoyoos, Shemeelkameen River. Arrives in May; leaves in October.
Accipiter mexicanus	Both common east of the Cascades.
— Cooperii	Only summer visitors.
— fuscus	More common on Vancouver Island than either east or west of the Cascades.
Buteo montanus	An abundant species. Seen constantly east of the Cascades.
Archibuteo lagopus	Sumass and Osoyoos Lakes.
— ferrugineus	Seen only at Sumass.
Circus hudsonius	Abundant. Arrives in May and June.
Haliectus leucocephalus	Throughout British Columbia and Vancouver Island. Winters.
Pandion Carolinensis	Seen near all lakes and rivers. Winters at the island.
Bubo virginianus	Abundant east and west of the Cascades.
Scops asio	Rather a rare species. Winters east of the Cascades.
Otus Wilsonianus	Common throughout British Columbia.
Brachyotus Cassinii	Sumass and Chelukweyuk prairies.
Syrnium cinerum	A rare species; shot at Sumass only.
Nyctale acadica	Obtained only east of the Cascades.
Surnia ulula	Rock Creek, Lake Osoyoos.
Glaucidium gnoma	A rare and beautiful little species, but seldom seen. Migratory; arriving at Vancouver Island in May.
Nyctea nivea	Not unfrequently seen near the entrance to the Fraser River.
Athene cunicularia	Seen only east of the Cascades.

Picidæ.

Picus Harrisii	Vancouver Island, Sumass, Osoyoos. Arrives in May. Winters at Vancouver Island.
— Gairdneri	Much as preceding.
— albolarvatus	A rare and beautiful species. Obtained only east of the Cascades.
Picoides arcticus	Obtained only east of the Cascades.
— hirsutus	East and west of the Cascades.
Hylatomus pileatus . . .	Common east and west of the Cascades.
Melanerpes torquatus . . .	Shot only in the open timbered lands, in British Columbia, east of the Cascades.
Colaptis mexicanus . . .	The most abundant of the summer visitors to Vancouver Island and British Columbia.
Sphyrapicus varius . . . — ruber	Vancouver Island, Sumass, Osoyoos, valley of the Columbia. Both species.
Colaptes auratus . . . — — (var.) hybridus . . .	Seen only at Sumass.

Trochilidæ.

Trochilus Alexandri . . .	Obtained only in the valley of the Columbia.
Stellata Calliope	Syniakwateen, and summit of Rocky Mountains, 7,000 feet altitude.
Selasphorus rufus . . .	Common on Vancouver Island and throughout British Columbia.

Cypsilidæ.

Nephocaetes niger . . .	Sumass and Fort Colville.
Chaetura Vauxii	Sumass only.

Caprimulgidæ.

Chordeiles popetue . . .	Vancouver Island and throughout British Columbia.

Alcedinidæ.

Ceryle Alcyon	Very abundant.

Tyranninæ.

Tyrannus carolinensis . . .	Vancouver Island and throughout British Columbia. Arrives in May; leaves in October.
— verticalis	As preceding.
Sayornis Sayus	All these Flycatchers are found in British Columbia, and some of them also visit Vancouver Island; arriving in May, and leaving in September and October.
Centopus borealis . . .	
— Richardsonii	
Empidonax pusillus . . .	
— acadicus	
— flaviventris	

Turdidæ.

Turdus migratorius . . .	The three species are plentifully distributed, reaching Vancouver Island in May, a little later in British Columbia. Leave in October. A few only winter on the island.
— naevius	
— Pallasii	
Sialia mexicana	Common on Vancouver Island and throughout British Columbia.
— arctica	Seen only east of the Cascades; arriving in May; flocking after nesting; leaving in October.
Regulus satrapa	Very plentiful on Vancouver Island and in British Columbia.
— calendula	Seen only east of the Cascades.
Hydrobata mexicana . . .	Very common on all rivers.

Sylvicolidæ.

Anthus ludovicianus . . .	Common on grassy prairies. Shot it only east of the Cascades, on the Spokan and Grand Prairies.

Geothlypis trichas	Vancouver Island and British Columbia.
— Macgillivrayi	Vancouver Island and British Columbia. May and October, arrives and departs.
Helminthophaga celata	Syniakwateen.
Dendroica Townsendii	These Warblers have much the same range in Vancouver Island and British Columbia, arriving in May and leaving in October.
— nigrescens	
— coronata	
— Audubonii	
— æstiva	
— maculosa	
Myodioctes pusillus	Much the same as the Warblers.
Setophaga ruticilla	Syniakwateen only.
Pyranga ludoviciana	Generally distributed, and migratory.

Hirundinidæ.

Cotyle riparia	Much more plentiful east than west of the Cascades. Arrive in May, and leave in September.
— serripennis	
Hirundo horreorum	
— thallassina	
— bicolor	
— lunifrons	

Bombycillidæ.

Ampelis garrulus	Shot only east of the Cascades.
— cedrorum	Common on Vancouver Island, and along the Fraser and Columbia rivers.
Myadestis Townsendii	Very rare. Shot them once only in the Columbia valley.

Laniidæ.

Collyrio borealis	Tolerably abundant.
Vireo olivaceus	Syniakwateen.
— gilvus	Syniakwateen.
— solitarius	Sumass, Vancouver Island, Syniakwateen. All migratory.

Liotrichidæ.

Salpinctes obsoletus Thriothorus Bewickii	Vancouver Island and Sumass. Both migratory.
Cistotherus palustris Troglodites Parkmani — hyemalis	All plentifully scattered about the open timber, and round the edges of prairies. Only summer visitors.

Certhiadæ.

Certhia americana	The only species found, and not by any means plentiful.

Sittinæ.

Sitta aculeata — canadensis — pygmea	Much the same distribution, the two latter species being more abundant east of the Cascades.

Paridæ.

Parus occidentalis — montanus — rufescens Psaltiparus minimus	All four species abundant everywhere.

Alaudidæ.

Eremophila cornuta	Sumass, Osoyoos, Vancouver Island, and Grand Prairie.

Fringillidæ.

Hesperiphona vespertina Pinicola canadensis	Syniakwateen, valley of the Columbia. Never saw them west of the Cascades.
Carpodacus californicus — Cassinii Chysometris tristis — pinus Curvirostra americana Aegiothus linaria	These are all abundant summer residents, on both slopes of the Cascades.

Leucosticte tephrocotis	Summits of the Cascades and Rocky Mountains. Very rare. Breeds at an altitude of 7,000 feet above the sea level.
Plectrophanes nivalis	Sumass, Fort Colville.
Passerculus savanna	Common about the prairies and open timbered lands. Arrive in May, leave in September.
— sandwichensis	
Chondestes grammaca	
Zonotrichia Gambellii	
— coronata	
— albicollis	
Junco oregonus	The most abundant small bird in British Columbia. Arrives early in May, and leaves in October.
Spizella monticola	Regular summer visitors.
— socialis	
— Brewerii	
Melospiza rufina	
— Lincolnii	
Passerella Townsendii	
Cyonospiza amœna	

Icteridæ.

Agelaius phœniceus	Abundant in some localities only during the flocking, after nesting.
Molothrus pecoris	
Sturnella neglecta	
Icterus Bullockii	
Scolecophagus cyanocephalus	

Corvidæ.

Cervus americana	For description of habits, see chapter on Crows, Vol. II.
— carnivorus	
— caurinus	
Picicorvus columbianus	
Pica hudsonica	
Cyanura Stelleri	
Perisoreus canadensis	

Columbidæ.

Ectopistes migratoria Columba fasciata Zenaidura carolinensis	Never seen in large flocks. Arrive in May, and leave in October.

Tetraonidæ.

Tetrao obscurus — Franklinii Centrocercus urophasianus Pediocaetes phasianellus Bonasa Sabinii Lagopus rupestris	Vide chapter on Game Birds, Vol. II.

Gruidæ.

Grus canadensis	Very common east and west of the Cascades.

Ardeidæ.

Ardea herodius Botaurus lentiginosus	Sumass prairies, Vancouver Island, and streams east of the Cascades, Osoyoos Lakes.

Charadridæ.

Aegialitis vociferus	Common throughout British Columbia.
Squaturola helvetica	Not at all plentiful. Seen usually on the mud flats at low tide.
Aphriza virgata	Rare. Frequents rocks along the sea-coast. Shot it at Nainimo and Fort Rupert.

Haematopodidæ.

Hæmatopus palliatus Strepsilas melanocephalus	Common on the rocks in Esquimalt Harbour.

Phalaropodidæ.

Phalaropus hyperboreus . .	In most streams east of the Cascades. I also shot it in Esquimalt Harbour.

Scolopacidæ.

Gallinago Wilsonii . . .	Not very plentiful. Langley, Sumass, Osoyoos.
Macrorhamphus scolopaceus .	Most of these breed in British Columbia, arriving in May and leaving in October.
Tringa subarquata . . .	
— alpina	
— maculata	
— Bonapartii	
— Wilsonii	
Ereunetes petrificatus . .	
Tringoides macularia . . .	
Gambetta flavipes . . .	Arrive and breed as the above.
Heteroscelus brevipes . . .	
Numineus longirostris . . .	
Arctiturus Bartramius . . .	Vide Vol. II.
Tringites rufescens . . .	All three breed at the Osoyoos Lakes.
Limosa fedoa	
Fulica americana . . .	

Cygninæ.

Cygnus americanus . . .	Common throughout British Columbia.
— buccinator	

Anserinæ.

Anser hyperboreus . . .	Vide Vol. II.
— Gambellii	
Bernicla canadensis . . .	
— Hutchinsii	

Anatinæ.

Anas boschas	Common both on the coast and on lakes and rivers inland.
Defila acuta	
Nettion carolinensis . . .	
Querquedula discors . . .	

Querquedula cyanoptera	Regular visitors.
Spatula clypeata	
Aix sponsa	
Chaulelasmus streperus	
Mareca americana	
Fulix marila	
— affinis	
— collaris	
Athya americana	
— vallisneria	
Bucephala americana	
— islandica	
— albeola	
Histrionicus torquatus	
Harelda glacialis	
Melanetta velvetina	
Pelionetta perspicillata	
Oidemia americana	
Erismatura rubida	
Mergus serrator	
Lophodytes cucullatus	

Diomedeinæ.

Diomedia brachyura	Common in Puget's Sound, and in the Gulf of Georgia.
— fuliginosa	

Laridæ.

Larus glaucescens	All found along the coast, and in the Gulf of Georgia.
— argentatus	
— occidentalis	
— californicus	
— delawarensis	
— Suckleyi	
Blasipus Heermanni	
Chroicocephalus Philadelphia	
Rissa septentrionalis	

Pellicanidæ.

Pellicanus erythrorhyncus	Rather rare. Found in Puget's Sound; and the former at their breeding grounds at the Klamath Lakes.
— fuscus	

Phalacrocoracidæ.

Graculus cilophus — violaceus Colymbus septentrionalis — torquatus	All abundant about Fort Rupert.

Podicipinæ.

Podiceps cornutus — cristatus — griseigena — occidentalis Podilymbus podiceps	Common in all inland lakes and streams.

Alcidæ.

Mormon cirrhata Cerorhina monocerata Uria columba	Found in the Gulf of Georgia. Breed on the islands.

REPTILES.

Order I. CHELONIA—TURTLES.

Actinemys marmorata. (Agass.)

The Western Pond Turtle.

I obtained these turtles at Walla-walla in the month of June. They had left the streams, and were wandering about in the grass to deposit their eggs. Apart from the egg season, it is a most difficult matter to catch them. I have seen them in nearly every lake and pool east and west of the Cascades. They are also common on Vancouver Island.*

* Vide Vol. I.

Order II. SAURIA—THE LIZARDS.

Elgaria Principis. (Baird and Girard.)

Spotted Elgaria.

I obtained specimens of this lizard at Walla-walla and on the banks of the Chelukweyuk river. I found it in both cases under stones, in turning them over to hunt for beetles. Dr. Suckley records it as being found west of the Cascade range, but I never met with it; I should not say that it was by any means an abundant species.

Phrynosoma Cornutum. (Gray.)

This species is much larger than Tapaya Douglassii, and has a much more extensive geographic range. The specimens I brought home were obtained on the open sandy plains laying north of the Klamath lakes—these plains appear to be its limit north, beyond this Tapaya Douglassii replaces it—and also on the sunny hill sides at Colville. Whether it is to be found along the coast range, or west of the Cascade mountains, I am not sure; at any rate I never saw it there. Its colour very nearly approximates the basaltic piles, in the cracks of which it lives.

Tapaya Douglassii. (Girard.)

The Oregon Horned Toad.

I never saw this singular looking lizard on the west slope of the Cascades, but they abound on the sand

plains on each side of the Columbia river;* I also saw them on the Tobacco plains, between the Kootanie river and the Galton mountains, and in the Flathead valley, which is about 4,199 feet above the sea level. They live on the dry sandy plains, and run so much like a mouse that I have often been deceived, and taken them for small mammals. They live in holes generally at the roots of a wild sage (the Artemesia) bush, and are perfectly harmless, although their looks sadly belie them. I have frequently taken them in my hand, and they neither bite or attempt to use their spines for defensive purposes. I obtained another species, much larger than this, on the sand plains near the Klamath Lakes, that does not appear to range as far north as this smaller species.—Vide *P. cornutum.*

OPHIDIA—THE SERPENTS.

CROTALUS LUCIFER. (Baird and Girard.)

The Western Rattlesnake.

The Rattlesnake, I believe I may safely say, is never found west of the Cascade range, neither is it in any great abundance north of the Columbia river; but at the Dalles, the Snake, Pelouse, and Spokan rivers, indeed I may say at every station along the entire Bndy. Line, and high up on the slopes of the Rocky Mountains its name is *legion.* I have often, when climbing a sunny hill-side, seen a rattlesnake coiled up on nearly every ledge and flat-lying stone. Specimens obtained at different localities vary very much in colour, both in the ground colour and mark-

* Vide Vol. II.

ings; and I am inclined to think the marking and general hue of the snake depends in a great degree on the nature of the rocks, or colour of the ground whereon it lives.

I never once saw the rattlesnake attempt to spring at or attack either man, dog, or horse. I have again and again teased a large rattlesnake with a twig, but never succeeded in provoking to attack me. Very sluggish in all its movements, and remarkably fond of creeping in the dust.

The Indian women use the rattle of the snake, both on the east and west side of the Rocky Mountains, either to produce abortion, or, as ergot of rye (*Secale cornutum*), is used by physicians to produce uterine contraction. The rattle has evidently some specific effect on the uterine tissues. I do not think there is more than one species west of the Rocky Mountains.

Bascanion vetustus. (Baird and Girard.)

The Green Racer.

This snake I obtained at Sumass and Chelukweyuk prairies, and along the Bndy. Line east of the Cascades. Its favourite haunt appears to be in the thin brush skirting the edges of open prairie land, and the principal part of its time in the summer appears to be passed in the bushes, up the stems of which it climbs with great ease and celerity; when there, it lazily basks away its time coiled round a branch. I suspect tree frogs and insect larvæ constitute its usual food.*

* Vide Vol. I.

WENONA PLUMBEA. (Baird and Girard.)

The Wood Snake.

Not at all uncommon on the Sumass and Chelukweyuk prairies; frequents dark shady spots, or long grass round the edges of pools. I never met with any east of the Cascades.

WENONA ISABELLA. (Baird and Girard.)

Much the same in habits and distribution as the above; common in the woods along the bank of the Chelukweyuk river. Both these snakes are also found on Vancouver Island.

BATRACHIA.

ANOURA (TAILLESS BATRACHIANS).

BUFO BOREAS. (Baird and Girard.)

This toad is common east and west of the Cascades, on the Sumass and Chelukweyuk prairies, in the valley of the Columbia, and on the Spokan prairies; fond of lurking in damp, dark underbrush and long grass found also on Vancouver Island.

BUFO COLUMBIENSIS.

The Columbian Toad.

Very common along the banks of the Columbia, and extending up the western slopes of the Rocky Mountains; fond of damp shady situations, especially the wooded edges of pools and lakes; in the summer time it frequently goes into the water.

There are two or three specimens of snakes I brought home not yet made out, which will perhaps be found to be new species.

EUTAINIA PICKERINGII. (Baird and Girard.)

Pickering's Garter Snake.

This snake I found on the Sumass and Chelukweyuk prairies, as well as along the entire course of the Bndy. Line to the Rocky Mountains. I also saw it in California and Oregon.

They come out of their winter sleeping places in May, and then lay about the edges of the brush, lazily sunning themselves. About a month later coupling time arrives, when they get near the water, and are usually seen in small groups. In the hot summer weather they spend nearly the whole of their time in the water. They are quite harmless, and feed principally on small Batrachians and insects.

EUTAINIA LEPTOCEPHALA. (Baird and Girard.)

The Small-headed Striped Snake.

The same remarks apply to this as *E. Pickeringii.*

EUTAINIA VAGRANS. (Baird and Girard.)

The Large-headed Striped Snake.

The same range and habits as the two preceding species.

EUTAINIA CONCINNA.

The One-striped Garter Snake.

Not so common on the west of the Cascades as the preceding species of Garter snakes, but I saw it at

Sumass, and on the trail that crosses the Cascade range from Fort Hope to Colville.

All the Garter snakes found along the course of Bndy. Line are very similar to each other, not only in habit but in the distribution of the markings; all are harmless, and may be handled with impunity.

PETUOPHIS WILKESII. (Baird and Girard.)

Oregon Bull Snake.

This snake attains a much larger size than any other species in this district; I have frequently seen them three or four feet long. The snake is common on both sides of the Cascades; in the spring it keeps on the grassy prairie land, but in the hot weather retires to the shores of lakes and ponds, or the margins of streams, and spends much of its time in the water. Although quite harmless, it assumes a most menacing attitude when suddenly surprised on the open plain, curling itself up into a spiral, and hissing furiously. I obtained one very large specimen near Colville, another at Sumass, and a third near the foot of the Galton Mountains. I never saw it on Vancouver Island, although I think it is very likely that it lives there in the open valley land.

I obtained another species of Petuophis, but it has not yet been determined or named.

ELGARIA GRANDIS. (Baird and Girard.)

Banded Elgaria.

I obtained this beautiful lizard at the Blacksmith's Camp, on the Chelukweyuk river; I also saw it at

Walla-walla on the banks of the Columbia. The hot sandy plains about Walla-walla seem to be a favourite haunt for several species of lizards. The wild sage grows about in tufts or patches, and under the roots live the lizards: the sand is covered with their tracks; they are so sharp and active that it is very difficult to catch them.

SCELOPORUS OCCIDENTALIS.

Western Fence Lizard.

This lizard is very common on the sand plains along the banks of the Columbia river. I also obtained it at Colville (altitude above sea level 1,268 feet). I never saw it west of the Cascades, although Dr. Suckley mentions it as being found at Steilacum. Its habit is to frequent dead timber and to hide under stones and fallen logs; it often climbs into the pine trees, and all its motions are very agile and graceful.

SCELOPORUS GRACIOSUS. (Baird and Girard.)

Slender Fence Lizard.

This lizard is very common on the large masses of basaltic rocks* that start up like ogres' castles on the sand plains between Walla-walla and Colville. I saw a great many of them at the Snake river ferry, on the rocks about the Pelouse river.

URADELA (TAILED BATRACHIANS).

TARICHA TOROSA. (Gray. Cat. Brit. Mus. 11–1656, p. 25.)

The Warty Salamander.

A widely-distributed species found east and west of the Cascades, and on the western slope of the Rocky

* Vide Vol. II.

Mountains; its haunts are in dark damp situations, where it remains for hours on a log or a stone perfectly still; when in motion its mode of progression is slow and lazy. I believe it passes the winter buried deeply in the sand or in damp earth banks. I saw a salamander that I imagine was this species (but did not obtain it) on Ptarmigan hill* near some running water; this was late in the year (October), and 7,000 feet above the sea level. I also obtained specimens at Sumass and Colville.

LIST OF COLEOPTERA.

The new species are distinguished by an *.

GEODEPHAGA. (Mac Leay.)

CICINDELIDÆ.

Cicindela. (Linn.)
vulgaris.

CARABIDÆ.

Elaphrus. (Fabr.)
intermedius. (Kirby.)
Calosoma. (Weber.)
*irregulare. (Walk.)
Callisthenes.
*pimeloides. (Walk.)
Carabus. (Auct.)
*bicolor. (Walk.)
Cychrus. (Fabr.)
angusticollis. (Eschs.)
tuberculatus. (Harris.)
Chlænius. (Bon.)
sericeus. (Dej.)
Agonum. (Bon.)
seminitidum.
Pterostichus. (Auct.)
*calligatus. (Walk.)
validus. (Lec.)
similis. (Kirby.)
Amara. (Bon.)
*extensa. (Walk.)
communis.

HARPALIDÆ.

Anisodactylus. (Dej.)
californicus.
Harpalus. (Latr.)
*defixus. (Walk.)

BEMBIDIIDÆ.

Bembidium. (Latr.)
*æqualis. (Walk.)

HYDRADEPHAGA. (Mac Leay.)

Dytiscus. (Linn.)
Ooligbukii. (Kirby.)
Acilius. (Leach.)
semisulcatus. (Aubé.)
Hydaticus. (Leach.)
zonatus. (Koppe.)
Tropisternus. (Sol.)
*binotatus. (Walk.)
Laccophilus. (Leach.)
maculosus. (Linn.)

* Vide Vol. I.

BRACHELYTRA.

ALEOCHARIDÆ.

Atemeles. (Dill.)
*reflexa. (Walk.)

STAPHYLINIDÆ.

Creophilus. (Kirby.)
villosus.

MECROPHAGA.

SILPHIDÆ.

Mecrophorus.
Melsheimeri. (Kirby.)
*conversator. (Walk.)

HISTERIDÆ.

Saprinus. (Erich.)
*consimilis. (Walk.)
*fimbriatus.
Trogosita. (Oliv.)
mauritanica. (Linn.)
virescens. (Fabr.)

DERMESTIDÆ.

Dermestes. (Linn.)
lardarius. (Linn.)

CUCUJIDÆ.

Cucujus.
puniceus. (Mann.)

HYDROPHILIDÆ.

Hydrous. (Leach.)
triangularis. (Say.)
Philhydrus. (Sol.)
*lividus. (Walk.)

LAMELLICORNES.

CETONIIDÆ.

Cremastochilus.
*armatus. (Walk.)

RUTELIDÆ.

Anomala. (Köppe.)
*contermina. (Walk.)
Ancylonica.
*nigropicea. (Walk.)
*consequens. (Walk.)
*uninotata. (Walk.)

MELOLONTHIDÆ.

Rhizotrogus.
*collocatus. (Walk.)
Serica. (Mac Leay.)
*crassata. (Walk.)
Melolontha.
decemlineata. (Say.)

COPRIDÆ.

Coprobius. (Latr.)
simplex. (Lec.)

EUPLURUS.

subterraneus.

BUPRESTIDÆ.

Dircea.
tuberculata. (Harris.)
Chalcophora. (Sol.)
angulicollis. (Lec.)
Ancylocheira. (Eschs.)
rusticorum. (Kirby.)
aurulentum.
*ornata. (Walk.)
Trachypteris.
prasina. (Lec.)
decolorata. (Lass. & Gar.)

ELATERIDÆ.

Alaus.
luscus. (Fabr.)
Adelocera.
*vetusta. (Walk.)
Athous. (Eschs.)
*vittatus. (Walk.)
Selatosomus.
*semimetallicus. (Walk.)
Limonius. (Eschs.)
*consimilis. (Walk.)

CLERIDÆ.

Clerus.
sobrius. (Walk.)
nubilus. (Klug.)
Corynetes. (Herbst.)
violaceus. (Fabr.)

HETEROMERA.

BLAPTIDÆ.

Eleodes. (Eschs.)
*convexicollis. (Walk.)
*conjuncta. (Walk.)
*latiuscula. (Walk.)
*subtuberculata. (Walk.)
caudata. (Sol.)
*binotata. (Walk.)

CONIOTIDÆ.

Coniontis ovalis. (Eschs.)

CŒLOMETOPIDÆ.

Cœlocnemis.
californica? (Mann.)
dentipes. (Esch.)

TENEBRIONIDÆ.

Iphthinus.
*servilis. (Walk.)
*servator. (Walk.)
*subligatus. (Walk.)

MELOIDÆ.

Lytta.
*immerita. (Walk.)
vesicatoria. (Linn.)
Nemognatha.
*bicolor. (Walk.)

HELOPIDÆ.

Helops.
*inclusus. (Walk.)
Eusattus. (Lecont.)
muricatus. (Lec.)

RHYNCHOPHORA.

ATTELABIDÆ.

Rhynchites. (Herbst.)
*congrua. (Walk.)

LONGICORNES.

PRIONIDÆ.

Prionus. (Geoff.)
pocularis. (Dahl.)
Macrotoma.
spiculigera. (White.)
Spondylus.
apiformis.

CERAMBYCIDÆ.

Clytus. (Fabr.)
Sayi. (Lory.)
Eriocephalus.
productus. (Lec.)

LAMIADÆ.

Monohammus.
clamator. (Lec.)
resutor. (Kirby.)
Eutrypanus.
*princeps. (Walk.)

LEPTURIDÆ.

Trypocerus.
*cervinus. (Walk.)
Leptura.
annulata. (Lory.)
chrysocoma. (Kirby.)
Toxotus.
*perductor. (Walk.)
Pachyta.
litura.
sexmaculata.
Graptodera.
plicapennis.
Cryptocephalus.
*bisignatus. (Walk.)
Chelymorpha.
Argus.

Order. COLEOPTERA.

Fam. Carabidæ. (Mac Leay.)—*Genus* Calosoma. (Weber.)

Calosoma irregulare. N. S.

Æneo-nigrum, capite antico ruguloso, thorace subiliter ruguloso, stria media, lateribus retusis valde convexis; elytris rugosis lineis sex e punctis auratis punctis, submarginalibus auratis minoribus.

Æneous black; black beneath. Head rugulose in front, with an impression and a retuse border on each side. Thorax more finely rugulose than the head, with an impressed middle line, retuse and very convex along each side. Elytra less finely rugulose than the head; each with three discal lines of gilded points, and with a submarginal line of more minute gilded points. Length of the body, 12 lines.

This species has no regular striated lines on the elytra, and is therein quite different from *C. calidum* and from *C. frigidum.* It is allied to the Siberian *C. denticella* and to two species from California and Vancouver Island.

Genus Callisthenes. (Fischer.)

Callisthenes pimelioides. N. S.

Nigra, brevis, lata, obscura, subtilissime punctata; capitis lateribus retusis, excavatis, disco antico sublevi; thorace lateribus subconvexis, subretusis, stria media tenui; elytris lineis pustularibus lateribus valde rotundatis.

Calosoma black, short, broad, thick, dull. Head and thorax very finely and thickly punctured. Head in front, with an almost smooth disc, and a retuse and excavated border on each side. Thorax slightly convex and retuse along each side, narrower hindward, with a slight impressed middle line. Elytra very convex on each side; each with about seventeen lines of minute pustules. Length of the body, 8 lines.

It is somewhat allied to an undescribed *Callisthenes* from California, but is quite distinct.

Genus CARABUS. (Linn.)

Carabus bicolor. N. S.

Niger, breviusculus, subtilissime punctatus; thorace stria media bene determinata; lateribus subconvexis, angulis posticis productis; elytris cupreis lineis sex e pustulis elongatis nigris; lateribus subconvexus.

Black, rather short. Head and thorax very minutely punctured, the former with the usual impression on each side in front. Thorax with an impressed distinctly marked middle line; sides slightly convex; hind angles produced, extending over the fore border of the elytra. Elytra cupreous; each with three lines of elongated black pustules, and with a submarginal line of minute impressions; sides slightly convex. Length of the body, 8 lines.

This belongs to the group of *C. ligatus* and of *C. Mœander*, which it resembles in the sculpture of the elytra.

Fam. FERONIIDÆ. (De Laporte.)—*Genus* OMASEUS. (Zeigler.)

Omaseus colligatus. N. S.

Fœm. niger, nitens; thorace postice subcontracto sulco transverso antico excavato stria media striis duabus lateralibus parvis margine postico ruguloso; elytris obscuris striatis punctis octo impressis lineis duabus submarginalibus punctularibus lateribus subapicalibus subexcavatis.

Female.—Black. Head and thorax shining, almost smooth. Head in front with a slight transverse impressed line, and with two broad longitudinal minutely-punctured furrows. Thorax slightly contracted hindward, rugulose along the hind border, with a curved transverse impressed line in front, with a distinct middle impressed line, and with two short impressed lines which extend to one-third of the length from the hind border. Elytra dull; each with eight longitudinal lines, with a row of slight submarginal excavations, and with four punctures—first, third, and fourth punctures, on the third line; second puncture, on the second line; exterior border, with a very slight subapical excavation. Length of the body, 7 lines.

Genus AMARA. (Bonelli).

Amara extensa. N. S.

Nigra, capite foveolis duabus e linea transversa impressa connexis; thorace stria tenui postice subtiliter ruguloso sulculis duobus lateralibus; elytris elongatis

subobscuris lineis bene determinatis, palpis tarsisque piceis, antennis basi rufis.

Black, smooth, shining. Head in front with two slight discal impressions, which are connected by a slight transverse impressed line. Thorax slightly broader hindward, with a slight impressed line; space along the hind border minutely rugulose, with two short broad longitudinal furrows. Elytra elongate, slightly dull; each with eight distinctly marked lines, and with minute punctures along the exterior border. Palpi and tarsi piceous. First and second joints of the antennæ red. Length of the body, 4 lines.

This species has a somewhat narrower body and more elongated thorax than *A. vulgaris*, which also inhabits North America.

AMARA COMMUNIS. (Gyllenhahl.)

Ænea, nitens, capite stria transversa antica stria media foveolisque duabus lateralibus posticis; elytris striatis ex parte nigricante æneis.

Æneous, smooth, shining. Clypeus, antennæ, legs and underside black. Head with a transverse impressed line in front. Thorax with a slight impressed line, and on each side with a slight impression near the hind border, at half the distance between the line and the exterior border. Elytra partly blackish æneous, with the usual eight longitudinal lines on each, and with impressions along the exterior border. Length of the body, 3 lines.

This species agrees exactly with the European *A. communis*. In sculpture it comes between *A. lævi-*

pennis and *A. discors* of British North America, and the elytra are somewhat shorter than those of *A. californica.*

Fam. HARPALIDÆ. (Mac Leay.)—*Genus* HARPALUS. (Latr.

Harpalus defixus. N. S.

Niger, nitens, antennis rufescentibus; thorace stria antica media, striæque media tenuissimis spatio postico ruguloso sulculis duobus lateralibus, elytris striatis.

Male black, smooth, shining; antennæ reddish; thorax slightly excavated in the disc on each side hindward; very slightly rugulose along the hind border, with a longitudinal impressed line, and in front with a transverse impressed line, both extremely slight. Each elytron with nine impressed lines. Tibiæ and tarsi piceous. Length of the body, $4\frac{3}{4}$ lines.

Closely allied to *H. æneus.* The sides of the thorax are less rounded than those of *H. interpunctatus, rotundicollis, laticollis,* and *carbonarius* of British North America, and it is very distinct from other North American species, such as *H. pleuriticus, H. basilaris,* and *H. ochropus.*

Fam. BOMBIDIIDÆ. (Staph.)—*Genus* PERYPHUS. (Megerle.)

Peryphus æqualis. N. S.

Subæneo viridis; capite antico bisulcato; palpis, antennis, pedibusque nigris; thorace stria media margine postico bifo violato; elytris striatis punctis duobus impressis.

Green, slightly tinged with æneous. Head with a longitudinal furrow on each side in front; palpi, antennæ, and legs black. Thorax with an impressed middle line, and with an impression on each side by the hind border. Elytra with distinctly marked impressed lines, and with two punctures on the third line from the interior border. Length of the body, 3½ lines.

Quite distinct from the American *P. sordidus* and *P. scapularis.*

Fam. DYTICIDÆ. (Leach.)—*Genus* LÆCOPHILUS. (Leach.)

Læcophilus maculosus. N. S.

Piceus; capite thoraceque obscure; ochraceis elytris vittis duabus marginalibus ochraceis postice abbreviatis et flexis, punctis duobus posticis marginalibus ochraceis; abdomine ochraceo; pedibus obscure ochraceis.

Piceous, smooth, shining. Head and thorax mostly dark ochraceous. Elytra with two ochraceous stripes, which widen from the base along full half the length of the exterior border, and are there bent, and terminate in a short streak towards the disk; two hindward marginal ochraceous points on each elytron. Abdomen ochraceous. Legs dark ochraceous. Length of the body, 3 lines.

It also inhabits the northern states of America.

Fam. ALEOCHARIDÆ. (Leach.)—*Genus* ATEMELES. (Dillwyn.)

Atemeles reflexus. N. S.

Ferrugineo rufus, latus; antennis piceis basi ferru-

gineo rufis incrassatis; thoracis lateribus valde dilatatis; femoribus latis; tibiis subarcuatis; tarsis setosis.

Ferruginous red, broad. Antennæ piceous, shorter than the body; first joint ferruginous red, incrassated. Thorax much dilated on each side; hind angles prominent, rounded; elytra smooth, shining, covering almost one-third of the length of the abdomen. Legs moderately long; femora broad; tibiæ slightly curved; tarsi setose. Length of the body, 2½ lines.

Fam. HYDROPHILIDÆ. (Leach.)—*Genus* TROPISTERNUS. (Solier.)

Tropisternus binotatus. N. S.

Cupreo-niger, viridi subnitens; capitis lateribus anticis ochraceis; thorace vittis duabus latis marginalibus ochraceis, maculas duas nigrocupreas includentibus; elytris vittis duabus marginalibus ochraceis postice attenuatis intus excavatis, pedibus piceis.

Cupreous black, elliptical, partly and slightly tinged with green. Antennæ underside black. Head dark ochraceous along each side in front. Thorax with two broad marginal dull ochraceous stripes, each with an oblong oblique cupreous black spot near the hind border. Elytra bordered with dull ochraceous along the sides of the scutellum and along the exterior border; the two stripes are attenuated hindward, and are irregular and excavated on the inner side. Legs piceous. Length of the body, 6 lines.

It is especially distinguished from the other North and South American species by the black mark on each side of the thorax.

Genus PHILYDRUS. (Solier.)

Philydrus lividus. (Forster.)

Luridus, ellipticus, subtilissime punctatus; thorace nigricante subnebuloso; elytris lineis nigricantibus valde indistinctis.

Lurid, shining, elliptical, extremely minutely punctured. Head with a black band along the hind border. Thorax slightly clouded with blackish. Elytra with regular but very minute and indistinct blackish lines. Length of the body, $2\frac{3}{4}$ lines.

There is no perceptible difference between this species and the European specimens of *Philydrus lividus.*

Fam. HISTERIDÆ. (Leach.)—*Genus* SAPRINUS. (Erichson.)

Saprinus consimilis. N. S.

Ater, glaberrima; capite, thoracis lateribus, elytrisque postice subtilissime punctatis; elytris striis octo subobliquis subtilissimis postice abbreviatis, abdomine subtilissime punctato.

Deep black, very smooth and shining. Head, sides of the thorax, and elytra, excepting the fore disk, less shining, and very minutely punctured. Each elytron with four slightly oblique, finely impressed lines, which extend from the base to a little beyond the middle. Abdomen very finely and minutely punctured, extending very much beyond the elytra. Length of the body, $2\frac{3}{4}$ lines.

Nearly allied to *S. assimilis*, but the body is rather narrower, and the borders of the elytra are less rounded.

Fam. SILPHIDÆ. (Leach.) — *Genus* NECROPHORUS. (Fabr.)

Necrophorus conversator. N. S.

Niger, obscurus; subtiliter punctatus; capite nitente, subtilissime punctato sulcis duobus, postice connexis; thorace marginibus latis subreflexis; elytris maculis sex ochraceis.

Black, dull, thickly and minutely punctured. Head shining, very minutely punctured, with two furrows, which converge, and are connected hindward. Thorax with a broad and slightly elevated rim; transverse line in front, and longitudinal line distinctly impressed. Elytra with six ochraceous spots, of which four form an interrupted band before the middle, and the other two are near the hind border. Abdomen extending much beyond the elytra; four segments uncovered. Length of the body, 9 lines.

It is quite distinct from the North American *N. hebes, obscurus, Hallii, Melsheimeri, pygmæus,* and *velutinus.* In the markings of the elytra it resembles *N. defodiens,* but the scutellum is much smaller.

Fam. ATONIIDÆ. (Mac Leay.)—*Genus* CREMASTOCHEILUS. (Knoch.)

Cremastocheilus armatus. N. S.

Niger, aspere punctatus; capite bicornutos; thoracis angulis posticis valde productis; elytris litura basali pallida; femoribus tibiisque valde dilatatis.

Black, dull, roughly punctured. Head deeply retuse in front, with an acute projection on each side in front

of the eye. Thorax with the four angles smooth, much produced and very prominent, the hind angles especially so. Elytra broader than the thorax, and a little more than twice its length; each with a pale basal mark. Abdomen with a protuberance on each side at the tip; apical segment vertical. Femora and tibiæ punctured, much dilated. Length of the body, 6 lines.

It may be distinguished from *C. mexicanus* by the much more protuberant hind angles of the thorax, and by the pale mark at the base of the elytra.

Genus ANOMALA. (Köppe.)

Anomala? contermina. N. S.

Badia, subtiliter punctata; capite, thorace, pectoreque cano pilosis; abdomini ochraceo; elytris pallide cervinis cano subpubescentibus.

Chestnut colour, finely punctured. Head, thorax, and pectus clothed with hoary hairs. Clypeus retuse. Thorax broadest across the hind border, which is slightly convex; sides convex. Abdomen ochraceous. Elytra pale fawn colour, with thin hoary pubescence, broader than the thorax, and about thrice its length. Length of the body, 5 lines.

Fam. MELOLONTHIDÆ. (Mac Leay.)—*Genus* RHIZOTROGUS. (Latr.)

Rhizotrogus collocatus. N. S.

Badius, subtiliter punctatus; thoracis lateribus abdominis marginibus pedibusque fulvo pilosis; elytris striis paucis indistinctis.

Chestnut brown, finely punctured, a little paler beneath. Clypeus with a retuse transversely semi-elliptical border. Sides of the thorax, borders of the abdomen, and legs with long tawny hairs. Thorax much broader hindward than in front; sides convex. Elytra with a few indistinct striæ, broader than the thorax, and more than thrice its length. Length of the body, 8 lines.

Genus ANCYLONYCHA. (Dejean.)

Ancylonycha nigropicea. N. S.

Nigricante picea; capite, thorace confertim et subtiliter punctata; thoracis lateribus convexis; elytris punctato lineatis.

Blackish piceous, thickly and finely punctured. Clypeus short, slightly retuse, slightly excavated in front. Thorax broadest along the hind border; sides convex. Elytra with numerous lines of punctures, broader than the thorax, and about four times its length. Abdomen very finely punctured, projecting a little beyond the elytra. Length of the body, 8½ lines.

Ancylonycha consequens. N. S.

Obscure picea; pectore, abdomine, antennis, pedibusque piceis; capite thoraceque confertissime punctatis; thoracis lateribus convexis; elytris punctato lineatis.

Dark piceous. Underside, antennæ, and legs piceous. Head and thorax very thickly punctured. Clypeus slightly impressed in front. Thorax much broader than the head; sides convex. Elytra with regular lines of punctures, a little broader than the thorax, and about

thrice its length. Abdomen projecting very little beyond the elytra. Length of the body, 5½ lines.

This species is very nearly allied to the preceding one, but may be distinguished by its smaller size, its more thickly punctured head and thorax, and its shorter elytra.

Ancylonycha uninotata. N. S.

Badia; capite thoraceque confertim punctatis; thoracis disco subimpresso; pectore pilis fulvis dense vestito; elytris subcarinatis subtiliter punctatis et rugulosis.

Chestnut colour. Head and thorax thickly punctured. Clypeus very slightly excavated in front. Thorax with a small and slight excavation in the disk. Pectus thickly clothed with long tawny hairs. Elytra minutely punctured and rugulose, with four slight ridges, but not with lines of punctures, full thrice the length of the thorax. Abdomen thinly punctured, extending somewhat beyond the elytra. Length of the body, 10 lines.

Genus SERICA. (Mac Leay.)

Serica crassata. N. S.

Nigra, brevis, lata, crassa, obscura; subtilissime punctata; antennis pedibusque piceis; elytris striatis.

Black, short, broad, thick, dull, very minutely punctured. Clypeus with a slightly retuse border. Antennæ and legs piceous. Thorax broadest across the hind border, where it is almost twice the breadth of the head; sides very slightly convex. Elytra much broader than the thorax, and more than twice its length; each with about nine impressed lines. Length of the body, 4 lines.

Fam. BUPRESTIDÆ. (Leach.)—*Genus* ANCYLOCHEIRA. (Eschscholtz.)

Ancylochira ornata. N. S.

Aureo-viridis; capite thoraceque confertim punctatis stria longitudinali; elytris punctato lineatis cupreo bivittatis; abdomine subtus fasciis auratis apice cupreo.

Bright golden green. Head and thorax thickly punctured, with an impressed longitudinal line. Elytra with deeply impressed punctured lines, with a purplish tinge on each side in front, full four times the length of the thorax. Abdomen beneath with a short gilded band on the fore border of each segment; tip cupreous. Length of the body, 9 lines.

The cupreous stripes on the elytra of this species distinguish it from *A. aurulenta*, and from *A. decora*.

Fam. ELATERIDÆ. (Leach.)—*Genus* ADELOCERA. (Latr.)

Adelocera vetusta. N. S.

Nigra, confertim et subtiliter punctata, squamis cinereis ex parte tecta; thorace postice impresso margine bis inciso, angulis posticis subproductis; elytris substriatis.

Black, dull, thickly and minutely punctured, mostly covered with cinereous scales; these are mostly confluent, but are here and there isolated, so that various parts of the surface are uncovered. Thorax with a broad shallow excavation in the hinder disk; the margin with two shallow excavations on each side; hind angles

slightly produced. Elytra with slight and indistinct striæ, more than twice the length of the thorax. Length of the body, 8 lines.

Genus ATHOUS. (Eschscholtz.)

Athous quadrivittatus. N. S.

Niger; capite thorace confertissime et subtilissime punctatis; thorace pectoreque rufescente bivittatis; thoracis angulis posticis attenuatis acutis; elytris luteis punctato striatis, suturis piceis, tibiis tarsisque piceis.

Black, shining. Head and thorax very minutely and thickly punctured. Thorax and pectus with a broad reddish stripe on each side; hind angles produced into two acute spines. Elytra dull luteous, more than twice the length of the thorax; each with nine distinct regular punctured striæ; sutures piceous, except towards the base; tibiæ and tarsi piceous. Length of the body, 7 lines.

Genus LIMONIUS. (Eschscholtz.)

Limonius consimilis. N. S.

Niger, nitens, subtiliter punctatus; thoracis angulis elongatis acutis; elytrorum striis bene determinatis.

Black, shining, minutely punctured. Hind angles of the thorax elongate, acute. Elytra with the usual distinct regular striæ, more than twice the length of the thorax. Length of the body, $3\frac{1}{2}$ lines.

Genus DIACANTHUS. (Latr.)

Diacanthus semimetallicus. N. S.

Niger; capite thoraceque confertissime et subtilissime punctatis; thorace linea media impressa, angulis posticis

productis, sulcatis, acutis; elytris æneo-nigris striatis subtilissime rugulosis, basi subsulcatis.

Black. Head and thorax dull, extremely thickly and minutely punctured. Thorax with a slight impressed middle line; hind angles produced into two acute furrowed spines. Elytra æneous black, shining, extremely minutely rugulose, with many regular distinct striæ, full twice the length of the thorax; each elytron with a slight excavation in the disk at the base. Length of the body, 8 lines.

Fam. TELLIDÆ. (Leach.)—*Genus* CLERUS. (Geoffrey.)

Clerus sobrius. N. S.

Cupreo niger, nitens, aspere punctatus; capite thoraceque cinereo pilosis; elytris fascia cinerea lata incisa.

Cupreous black, shining, thinly and coarsely punctured. Head and thorax with cinereous hairs. Elytra with a broad cinereous middle band, which is narrower on each side, and is notched in front and behind. Length of the body, 5 lines.

This species is very different from the Californian *C. holosericeus.*

Fam. BLAPSIDÆ. (Latr.)—*Genus* IPHTHINUS. (Dej.)

Iphthinus servilis. N. S.

Niger, confertissime et subtilissime punctatus; capite thoraceque obscuris; thoracis lateribus convexis non retusis, angulis acutis; elytrorum lineis e punctis elongatis.

Black, very thickly and minutely punctured. Head and thorax dull. Head with an indistinct transverse impressed line in front of the eyes. Thorax almost twice broader than the head; sides convex, not retuse; hind angles prominent, acute. Elytra slightly shining, subfusiform, broader than the thorax, and nearly thrice its length, with regular lines of elongated punctures. Length of the body, 11 lines.

Iphthinus servator. N. S.

Niger, confertissime et subtilissime punctatus; capite thoraceque obscuris; thoracis lateribus subconvexis, antice retusis, angulis posticis subproductis; elytris subnitentibus lineis e punctis elongatis.

Black, very thickly and minutely punctured. Head and thorax dull. Thorax much broader than the head; sides slightly convex, retuse in front; hind angles slightly prominent. Elytra subfusiform, slightly shining, broader than the thorax, and nearly thrice its length, with regular lines of elongated punctures. Length of the body, 11 lines.

This species hardly differs from the preceding one, with the exception of the structure of the thorax.

Iphthinus subligatus. N. S.

Niger, confertissime et subtilissime punctatus; capite thoraceque obscuris; thoracis lateribus convexis, angulis posticis productis acutis; elytris subnitentibus subtiliter punctato lineatis.

Black, very thickly and minutely punctured. Head and thorax dull. Thorax much broader than the head;

sides convex; hind angles prominent, acute. Elytra subfusiform, slightly shining, broader than the thorax, and nearly thrice its length, with regular rows of minute punctures. Length of the body, 11 lines.

This may be distinguished from the two preceding species by the more minute punctures on the lines of the elytra.

Genus ELEODES. (Eschscholtz.)

Eleodes subtuberculata. N. S.

Nigra, obscura; capite thoraceque confertim punctatis; thorace lateribus subrectis, angulis anticis acutis; elytris ellipticis, tuberculato-lineatis.

Black, dull. Head and thorax thickly punctured. Head with a transverse impressed line between the base of the antennæ; clypeus somewhat shining. Thorax somewhat broader than the head, harder, broader behind than in front; sides almost straight; fore angles acute. Elytra elliptical, with numerous lines of minute tubercles, almost twice broader than the thorax, and about thrice its length. Length of the body, $5\frac{1}{2}$ lines.

Eleodes convexicollis. N. S.

Nigra; capite thoraceque subtilissime punctatis; capite incisuris tribus anticis; thoracis lateribus anticis valde convexis; elytris longiovatis, punctato-striatis.

Black, rather dull. Head slightly excavated on the fore border and on each side in front of the base of the antennæ. Head and thorax very minutely punctured. Thorax very convex on each side before the middle.

Elytra elongate oval, with distinct punctured striæ, somewhat broader than the thorax, and more than thrice its length. Length of the body, 14 lines.

Eleodes binotata. N. S.

Nigra, subnitens; capite thoraceque subtilissime punctatis; thorace binotata, lateribus antice, convexis, angulis anticis productis acutis; elytris punctato-striatis.

Black, slightly shining. Head and thorax extremely minutely punctured. Thorax with a slight impression on each side of the middle of the disk; sides convex before the middle; fore angles prominent, acute. Elytra subfusiform, with slight punctured striæ, nearly four times the length of the thorax. Length of the body, 10 lines.

Eleodes conjuncta. N. S.

Nigra, sat obscura, *H. convexicolli* affinis; thoracis lateribus minus rotundatis, scutellos majori; elytris angustioribus; capite thoraceque subtilissime punctatis; thorace binotato.

Black, rather dull, like *H. convexicollis* in structure. Head and thorax very minutely punctured. Thorax with a shallow discal on each side hindward; sides less convex than those of *H. convexicollis.* Scutellum larger. Elytra narrower; their sides more linear. Length of the body, 13 lines.

Eleodes latiuscula. N. S.

Nigra lata, sat obscura; capite thoraceque confertim et subtiliter punctatis; thoracis lateribus anticis convexis;

elytris substriatis confertissime punctatis, lateribus convexis.

Black, broad, somewhat dull. Head and thorax thickly and minutely punctured. Head with an indistinct transverse impressed line in front of the eyes; clypeus somewhat shining. Thorax much broader than the head; sides convex in front. Elytra elliptical, very thickly punctured, with slight striæ, much broader than the thorax, and nearly thrice its length; sides convex. Length of the body, 9 lines.

Fam. HELOPIDÆ. (Steph.)—*Genus* HELOPS. (Fabr.)

Helops inclusus. N. S.

Niger, nitens, subtilissime punctatus; thoracis lateribus convexis; elytris subtilissime striatis.

Black, shining, very minutely punctured. Head with a distinct transverse furrow in front of the eyes. Thorax a little broader behind than in front, much broader than the head; sides convex. Elytra with several very finely striated lines, a little broader than the thorax, and more than twice its length. Length of the body, $3\frac{1}{2}$ lines.

Fam. CANTHARIDÆ. (Leach.)—*Genus* LYTTA. (Linn.)

Lytta immerita. N. S.

Nigra, cinereo-tomentosa, subtus cinereo-pubescens; elytris linea marginali tenui cana.

Black, with cinereous tomentum; underside with cinereous pubescence. Elytra with a slender hoary border. Length of the body, 5 lines.

Genus NEMOGNATHA. (Illiger.)

Nemognatha bicolor. N. S.

Sublutea, subtilissime punctata; antennis, scutellos, pectore, abdomine, pedibusque nigris.

Dull, luteous, shining; very finely punctured. Mouth, antennæ, scutellum, pectus, abdomen, and legs black. Length of the body, 5½ lines.

Fam. ATTILABIDÆ. (Schönhorn.)—*Genus* RHYNCHITES. (Herbst.)

Rhynchites congrua. N. S.

Nigricante cyanea, aspere punctata; rostro thoracis longitudine, thoracis lateribus convexis; elytris latis lateribus subconvexis.

Blackish blue, roughly punctured. Rostrum as long as the thorax, slightly dilated towards the tip. Thorax narrower in front; sides convex. Elytra much broader than the thorax, and about twice its length; sides slightly convex. Length of the body, 3 lines.

Fam. CERAMBYCIDÆ. (Kirby.)—*Genus* EUTRYPANUS. (Dejean.)

Eutrypanus princeps. N. S.

Mas et Fœm.—Niger, punctatus, tomento cano et cervino varius; antennis canis nigro-annulatis; thorace fascia vittisque duabus canis, guttis duabus, anticis pallide cervinis; elytris fusco et cervino variis, fasciis

quatuor dentatis incisis canis. *Mas.*—Antennis corpore quadruplo longioribus. *Fœm.*—Antennis corpore plus duplo longioribus, oviductu.

Male and Female.—Black, roughly punctured; varied with hoary and with fawn-coloured tomentum. Antennæ hoary, with black rings. Thorax with the hoary hue forming a stripe on each side, and a slender curved band, in front of which there are two pale fawn coloured dots. Elytra with four irregular dentate and notched hoary bands; intermediate spaces partly brown or fawn colour. Length of the body, 10 lines. *Male.*—Antennæ four times the length of the body. *Female.*—Antennæ more than twice the length of the body exclusive of the ovipositor. Ovipositor much more than half the length of the body.

Fam. LEPTURIDÆ. (Stephens.)—*Genus* TYPOCERUS. (Leconte.)

Typocerus cervinus. N. S.

Cervinus; capite thoraceque subtilissime punctatis; antennis corporis dimidio longioribus; thorace bidentato; elytris pallidioribus diffuse punctatis.

Female.—Fawn colour. Head, thorax, antennæ and femora darker than the elytra. Head and thorax very minutely punctured. Antennæ more than half the length of the body. Thorax with one longitudinal and two transverse impressions, armed on each side with a short stout obtuse tooth. Elytra rather largely punctured. Length of the body, 12 lines.

Genus TOXOTUS. (Serville.)

Toxotus perductor. N. S.

Niger; capite guttis duabus fulvis; elytris fulvis nigro trifasciatis fascia; 1ª guttulari; 2ª interrupta; 3ª lata; fasciis duabus ventralibus fulvis; pedibus fulvis; genubus tarsisque nigris; femoribus tibiisque posticis apice nigris.

Black, rather dull. Head tawny beneath, and with a tawny dot on each side at the base of the antennæ. Pectus with a broad triangular tawny stripe on each side. Elytra tawny, with three black bands; first band very incomplete, consisting of four elongated dots; second band interrupted near the suture; third broader than the second, extending nearly to the tip, which is reddish tawny. Abdomen extending a little beyond the elytra; first and second segments beneath with tawny bands, which extend along the hind borders of the segments, and are dilated in the middle. Legs tawny; knees and tarsi black; hind femora and hind tibiæ with black tips. Length of the body, 8 lines.

Fam. CLYTHRIDÆ. (Kirby.)—*Genus* CLYTHRA. (Laichart.)

Clythra bisignata. N. S.

Obscure cyanea, nitens; antennis serratis; elytris punctato lineatis, macula basali rufescente.

Dark blue, shining. Head and thorax smooth. Antennæ serrated, not longer than the breadth of the head.

Elytra with lines of minute punctures; a reddish spot on each side at the base by the outer border, which is dilated near the base. Length of the body, 3 lines.

Order. NEUROPTERA.

Fam. Sialidæ. (Leach.)—*Genus* Chauliodes. (Latr.)

Chauliodes disjunctus. N. S.

Fuscus, cinereo-pilosus; capite rufescente punctato, postice sulcato, plagis convexis nigris; mandibulis apice nigris; pedibus luridis; alis cinereis e maculis plurimis fuscis sublineatis; alis anticis plagis quinque, costalibus macularibus fuscis maculisque duabus basalibus nigris.

Brown, with cinereous hairs. Head dark reddish, thickly punctured; hind part with longitudinal furrows, which intersect some elongated convex black shining spaces. Mandibles with black tips. Prothorax elongated, broader than long, much narrower than the mesothorax. Legs lurid. Wings cinereous, with numerous brown spots and dots, which form incomplete transverse lines. Fore wings with some of the spots collected into five costal patches; two large black basal spots. Length of the body, 18 lines; of the wings, 48 lines.

This species is mostly allied to *C. californicus*, but may be distinguished by its larger size and by the difference in the markings.

LIST OF LEPIDOPTERA.

Fam. PAPILIONIDÆ.

Gen. PAPILIO.

Papilio.
Turnus. (Linn.)
rutulus. (Boisd.)
Zelicaon. (Boisd.)
Parnassius.
clarius. (Eversm.)
Pieris.
Protodice.
Menapia. (Felder.)
Colias.
Chrysothome.
Philodice.
Danais.
Archippus.
Melitæa.
Pharos. (Boisd.)
Anicia. (Doubl.)
Argynnis.
Aphrodite.
Callippe. (Boisd.)
Argynnis.
Freya. (Var.)
Vanessa.
Antiopa. (Linn.)
Cardui. (Linn.)
Polychloros. (Linn.)
C. album. (Linn.)
Limenitis.
Lorquinii. (Boisd.)
Erebia.
Medusa.
Cœnonympha.
Davus. (Fabr.)
Lycæna.
Pheres. (Boisd.)

Tribe BOMBYCITES.

Fam. ARCTIIDÆ. (Leach.)

Gen. HALESIDOTA. (Hubn.)

Halesidota.
*angulifera. (Walk.)
*roseata. (Walk.)

ORDER. LEPIDOPTERA.

Fam. ARCTIIDÆ. (Leach.)—*Genus* HALESIDOTA. (Hubner.)

Halesidota angulifera. N. S.

Mas.—Pallide lutea; alis anticis fasciis quinque fuscescentibus obliquis angulosis; 1ª, indeterminata; 2ª et 3ª, qui connexis; 3ª et 4ta, qui postice conjunctis; 5ª, submarginali, lituris non nullis marginalibus fuscescentibus alis posticis albido-cinereis, venis pallide flavescentibus.

Male.—Pale luteous, paler beneath. Proboscis long.

Palpi porrect, pilose, rather slender, not extending beyond the front; third joint extremely short. Antennæ moderately pectinated. Abdomen extending much beyond the hind wings. Hind tibiæ with four rather short spurs. Fore wings with five oblique, irregular, zigzag, brownish bands—first band basal, very incomplete; second connected with the third in the middle; third and fourth united hindward; fifth submarginal; a few slight brownish marginal marks. Hind wings whitish cinereous; veins pale yellowish. Length of the body, 10 lines; of the wings, 24 lines.

Closely allied to *H. fulvo-flava.*

Halesidota? roseata. N. S.

Fœm.—Roseosrufa; subtus flavo-pilosa; capitis fascia thoracisque strigis sex pallide flavis; abdomine roseo basi lanuginoso flavescente; alis anticis strigis basalibus pallide flavescentibus, fasciisque tribus exterioribus albidis macularibus perobliquis; alis posticis albido-cinereis subhyalinis.

Female.—Rosy red. Body densely clothed and partly pale yellow beneath. Head with a pale yellow band on the front. Palpi extremely short. Thorax with six longitudinal pale yellow streaks. Abdomen rosy, lanuginous, and partly pale yellow towards the base, extending much beyond the hind wings. Fore wings with some pale yellowish streaks towards the base, and with three exterior whitish macular very oblique bands; spots mostly cuneiform; costa straight; tips slightly acute; exterior border slightly convex, extremely oblique; first and second inferior veins contiguous at the base; third very near the second; fourth remote

from the third. Hind wings whitish cinereous, slightly hyaline; veins and fringe slightly yellowish. Length of the body, 7 lines; of the wings, 20 lines.

This species may form a new genus. It differs somewhat from *Halesidota* in the structure of the veins of the fore wings.

LIST OF DIPTERA.

CULICIDÆ. (Steph.)
CULEX. (Linn.)
Culex.
*pinguis. (Walk.)

ASILIDÆ. (Leach.)
LAPHRITES. (Walk.)
LAPHRIA. (Fabr.)
Laphria.
*Columbia. (Walk.)

ŒSTRIDÆ. (Leach.)
CUTEREBRA. (Clark.)
Cuterebra.
*approximata. (Walk.)

MUSCIDÆ. (Leach.)
TACHINIDES. (Walk.)
EURIGASTER. (Macq.)
Eurigaster.
*septentrionalis. (Walk.)

Order DIPTERA.

Fam. CULICIDÆ. (Steph.)—*Genus* CULEX. (Linn.)

Culex pinguis. N. S.

Fœm.—Cervinus, robustus; rostro apicem versus nigro; abdominis pube subaurata; pedibus robustis pallidioribus; alis cinereis, venis fulvis subpilosis.

Female.—Fawn-colour, stout. Proboscis much longer than the head, and the thorax black towards the tip. Abdomen with slightly gilded down. Legs stout, paler than the body; tarsi darker. Wings cinereous; veins tawny; slightly pilose; radial and subapical veins, with long forks. Length of the body, 3½ lines; of the wings, 7 lines.

Fam. ASILIDÆ. (Leach.)—*Sub-Fam.* LAPHRITES. (Wlk.)—*Genus* LAPHRIA. (Fabr.)

Laphria columbica. N. S.

Mas.—Subæneo-nigro; capite pilis subauratis densissime vestito; mystace e setis nigris; thorace nigro-piloso, fascia subaurato-pilosa; abdomine apicem versus subaurato piloso; femoribus posticis in-crassatis nigro-pilosis; tibiis posticis lividis apice nigris; alis nigricantibus areolarum discis cinereis.

Laphria Male.—Black, with a very slight æneous tinge. Head very thickly clothed with slightly gilded hairs; vertex and hind side with black hairs; mystax composed of black bristles. Thorax clothed with short black hairs; fore part with fawn-coloured pubescence; a band of slightly gilded hairs across the hind part of the scutum. Abdomen clothed towards the tip with slightly gilded hairs. Legs mostly clothed with slightly gilded hairs; hind femora incrassated with black hairs; hind tibiæ livid, and with slightly gilded hairs, except towards the tips. Wings blackish; discs of most of the areolets cinereous; veins and halteres black. Length of the body, 9 lines; of the wings, 16 lines.

This species has most resemblance to *L. posticata*, from which it may be distinguished by the pale hairs on the hind tibiæ.

Fam. ŒSTRIDÆ. (Leach.)—*Genus* CUTEREBRA. (Clark.)

Cuterebra approximata. N. S.

Nigra; capite punctato; vertice linea glabra sulcata; thoracis tomento-cinereo; abdomine nigro-cyaneo; alis nigricantibus.

Black. Head minutely punctured above, slightly

rugulose towards the mouth; vertex with a slender, smooth, furrowed line. Thorax slightly covered with dark cinereous tomentum. Abdomen dark blue. Wings and alulæ blackish; veins black. Length of the body, 10 lines; of the wings, 18 lines.

Fam. MUSCIDÆ. (Latr.)—*Sub-Fam.* TACHINIDES. (Wlk.)

Genus EURIGASTER. (Macq.)

Eurigaster septentrionalis. N. S.

Fœm. — Nigra, setosa, latiuscula; capite argenteo-cinereo; vertice aurato; frontalibus atris; palpis rufescentibus; antennis aristæ dimidio incrassato; thorace vittis quinque cinereis; scutelli apice piceo; abdomine cinereo subtessellato; alis cinereis.

Female.—Black, setose, rather broad. Head silvery cinereous, gilded above; frontalia deep black, widening in front; facialia bordered with bristles along most of the length from the epistoma. Palpi reddish. Antennæ extending to the epistoma; third joint linear, rounded at the tip, full six times the length of the second; arista incrassated for half the length from the base. Thorax with five cinereous stripes; scutellum piceous at the tip. Abdomen slightly tesselated with cinereous, very bristly towards the tip, a little longer than the thorax. Wings cinereous; veins black; præbrachial vein forming an obtuse angle at its flexure, straight from thence to its tip.

Order HEMIPTERA.—*Sub-Order* HOMOPTERA.

Fam. CICADIDÆ. (Weitm.)—*Genus* CICADA. (Linn.)

Cicada occidentalis. N. S.

Fœm. — Nigra, subtus albido-tomentosa; facie et

prothorace testaceo marginatis; mesothorace lituris duabus cuneatis, lateribus margineque postice testaceis; segmentorum abdominalium marginibus posticis subtus luteis; femoribus tibiisque testaceo vittatis; alis vitreis basi læte rufis.

Female.—Black; underside with shining whitish tomentum. Head much narrower than the prothorax; transverse furrow in front testaceous; face transversely ridged on each side, with a testaceous border. Prothorax with four oblique furrows, which converge hindward; border testaceous; sides with slightly gilded pubescence, dilated and rounded hindward. Mesothorax with two V shaped testaceous marks, which extend from the fore border to the disk, and are indistinct except at the tips; sides and hind border testaceous. Abdomen thinly clothed with shining whitish pubescence; hind borders of the segments luteous on each side and beneath; dorsal opercula testaceous; sheaths of the ovipositor greenish. Femora and tibiæ with testaceous stripes; fore femora incrassated, with two teeth on the underside. Wings vitreous, bright red at the base; veins black, greenish towards the base. Fore wings with a greenish costa; first and second transverse veins slanting outward; first parted by more than twice its length from the second; third and fourth slightly slanting inward. Length of the body, 12 lines; of the wings, 32 lines.

This species is smaller than *C. septemdecim*, to which it has much general resemblance.

LIST OF HYMENOPTERA.

FORMICIDÆ.

Formica.

herculanea. (L.)
integra. (Nyl.)
umbrata. (Nyl.)
nigra. (Linn.)
lævigatas. (Nyl.)

MUTILLIDÆ.

Mutilla.

occidentalis. (L.)

Fam. POMPILIDÆ. (Leach.)—*Genus* POMPILUS. (Fabr.)

Pompilus comparatus. N. S.

Fœm. — Niger, subnitens, subtilissime punctatus; metathoracis linea impressa indistincta; abdomine rufo-glabro nitente, basi nigro, apicem versus nigricante; tibiis posticis tuberculatis; alis nigricantibus.

Female.—Black. Head and thorax thinly clothed with short black hairs, extremely minutely punctured, slightly shining. Metathorax well developed, with an indistinct impressed middle line. Abdomen red, smooth, shining, black at the base, blackish at the tip, a little longer than the thorax. Hind tibiæ tuberculate. Wings blackish. Length of the body, 7 lines; of the wings, 10 lines.

Pompilus pyrrhomelas. N. S.

Fœm.—Niger, subnitens, subtilissime punctatus; antennis robustis articulo 1° incrassato; metathorace transverse subruguloso linea impressa indistincta; segmentorum abdominalium marginibus posticis subglabris; tibiis posticis subtuberculatis; alis ochraceis, basi nigricantibus, apice fuscescentibus.

Female. — Black, extremely minutely punctured, clothed with black hairs, slightly shining. Antennæ

stout, shorter than the thorax; first joint incrassated. Metathorax transversely and minutely rugulose, with an indistinct middle impressed line. Abdomen fusiform, a little longer than the thorax; hind borders of the segments almost smooth. Hind tibiæ slightly tuberculate. Wings ochraceous, blackish at the base, brownish at the tips. Length of the body, 11 lines; of the wings, 16 lines.

LIST OF SPHEGIDÆ.

Ammophila. (Kirby.)
luctuosa. (St. Farg.)
Pelopœus. (Latr.)
architectus.

APIDÆ.

Andrena.
vicina.
victima.
perplexa.
nivalis.
Osmia.
simillima.
Apathus.
insularis. (Sm.)
Bombus.
vinatus.
vagans.
*flavifrons. (Smith.)
californicus.

TENTHREDINIDÆ.

Sirex.
*varipes. (Walk.)
albicornis. (Fabr.)
Chrysis.
*smaragdicolor. (Walk.)

Order HYMENOPTERA.

Fam. UROCERIDÆ. (Leach.)—*Genus* SIREX. (Linn.)

Sirex varipes.

Fœm.—Nigricante cyaneus; antennis nigris; abdomine purpurascente cyaneo, apice impresso; oviductus vaginis abdominis dimidio brevioribus; pedibus rufis; tibiis supra nigris; alis cinereis.

Female.—Blackish blue, clothed with black hairs. Antennæ black. Abdomen purplish blue, with a nearly circular excavation at its tip. Sheaths of the ovipositor

black, less than half the length of the abdomen. Legs red; conæ black; tibiæ black above. Wings cinereous; veins black. Length of the body, 10 lines; of the wings, 18 lines.

Fam. APIDÆ.—*Genus* BOMBUS.

Bombus flavifrons. N. S.

Hirsutus, ater; capite, thorace, abdomenisque fascia tenuis flavis; alis nigricantibus; ano nigro.

Female.—Length, 8½ lines. Clothed with black pubescence. The face and vertex have a pale yellow pubescence; that on the underside of the head is black. The anterior portion of the thorax before the insertion of the wings covered with pale yellow pubescence; also a narrow band of the same colour on the fourth segment of the abdomen; the wings blackish brown.

This species closely resembles *Bombus californicus*; from that species it differs in having darker wings, in the face and vertex being clothed with pale yellow pubescence, and in having a much narrower band on the abdomen.

Fam. CHRYSIDIDÆ. (Leach.)—*Genus* CHRYSIS. (Linn.)

Chrysis smaragdicolor. N. S.

Smaragdina, aspere punctata; antennis viridibus, apices versus nigris; abdominis segmenti 2^{i} margine postico subglabro, 3^{i} margine postico subruguloso, 4^{o} brevissimo non dentato; tarsis nigris; alis nigricantibus, postice cinereis.

Emerald green, thickly and somewhat coarsely punctured. Antennæ black, bright green towards the base. Abdomen more finely punctured than the thorax; second segment more finely punctured than the first, almost smooth and with purplish blue reflections along its hind border; hind border of the third segment slightly rugulose; fourth segment very short, not dentate. Tarsi black. Wings blackish, cinereous hindward; veins black. Length of the body, 7 lines; of the wings, 9 lines.

ARACHNIDÆ.

Nephila plumipes. (Koch.)

List, with descriptions of New Species of Annelides from Vancouver Island.

I have described the parasite in the keyhole limpet, *Lepidonotus lordi*, nov. sp., and where I found it, in Vol. II.

Lepidonotus insignis. (Baird.) N. S.

This is a very fine species of the genus *Lepidonotus*. It is rather more than three inches long, and is nearly half an inch in breadth exclusive of the setæ of the feet. On the upper surface the body is of a whitish colour, marbled with black. The sides, which are covered by the elytra, are white, and a broad line runs down the centre of the dorsum, throughout its whole length. The feet are encircled with fine black circular lines. The elytra, eighteen pairs in number, are oval, white, with black dots on the outer sides and centre, and they are marked

with a black semicircular patch on the inner edge. They do not overlap each other except near the head. On the body of the animal they are wide apart, leaving the centre of the back exposed. The proboscis is large and wrinkled, and the jaws are of a reddish-brown colour. The antennæ are five in number, the central one being nearly three times as long as the external pair, and of a pure white colour; the internal and external pairs white, tinged with black. The feet are very prominent, strong, rounded, conical, and armed with seven or eight stout brown bristles. The second branch is extremely small, and sends off two or three very small white setæ. The superior cirrus is tolerably long and sharp-pointed; it is pedunculated, the peduncle being stout, conical, and of a deep black colour. The inferior cirrus is short, conical, and sharp-pointed. The last segment of the body is terminated by two tolerably stout but not long cirri.—*Hab.* Esquimalt Harbour, Vancouver Island. (*Brit. Mus. Col.*)

Lepidonotus Lordi. (Baird.) N. S.

This species is about three inches long, and rather more than one-third of an inch in diameter at the broadest part of the body. It tapers gradually from the head to the tail, which is only about one-eighth of an inch broad. The colour is of a light brown, a broad line of a much darker brown running along the whole length of the centre of the back. On the surface a groove runs down the centre of the body throughout its entire length. The elytra are 35 pairs in number, thin, membranous, and of a light brown colour. The two first overlap each other slightly in the middle; but for the

rest of its length the centre of the back is uncovered. The antennæ are five in number; the central one short, of much the same length as the internal ones; the two external ones the longest, white, with a bright black ring round the upper part, but leaving the point white, which is acute at the apex. The feet are tolerably stout, and the two divisions are both furnished with sharp but curved pointed bristles. The superior cirri are white, and of a moderate length; the inferior ones being short. — *Hab.* Esquimalt Harbour, Vancouver Island. (*Brit. Mus. Col.*)

Lepidonotus Grubei. (Baird.) N. S.

This species is about 2 inches long and ½ an inch broad. The body underneath is of a uniform brown colour; above it is whitish, mottled with black. The elytra are 18 pairs in number, nearly round, rough with small tubercles, edged by a slightly raised margin, and mottled with black and white. They do not meet each other in the centre, but leave a portion of the back uncovered. The superior cirri are rather long, blunt pointed, pedunculated, marked with a black spot at the base, where they issue from the peduncle, and are ringed with black a little distance from the extremity. The inferior cirri are short and acute pointed. The feet are broad, and the bristles of both branches are stout, of a bright brown colour, and toothed on one edge near the extremity. The antennæ are five in number, and are all short, and nearly of equal length. —*Hab.* Esquimalt Harbour, Vancouver Island. (*Brit. Mus. Col.*)

Lepidonotus fragilis. (Baird.) N. S.

This species, owing to its brittle character, is in too bad a state to describe accurately. It is about 2½ or 3 inches long, and is rather narrow. The scales or elytra appear to be very thin and membranous; but as they are deciduous it is difficult to ascertain the number, especially as the worm is broken into several pieces. The superior cirri are stout and club-shaped at the tip. There appear to be no ventral cirri on the feet, and the superior cirri become nearly obsolete on the lower half of the body.

It was found by Mr. Lord, adhering to a star-fish; 'but,' he says, 'it is next to impossible to obtain one perfect, as they break themselves to pieces on the slightest touch, or however carefully killed.' In this respect it resembles a species of Annelide belonging to the group of vermiform Aphrodisians, described by Risso, as occurring in the Mediterranean under the name of *Eumolpe fragilis.*—*Hab.* Esquimalt Harbour, Vancouver Island. (*Brit. Mus. Col.*)

Nereis foliata. (Baird.) N. S.

This Nereid is of a dark grey colour above, and of a lighter hue underneath, somewhat iridescent It is 15 inches in length, and at the broadest part is about ½ an inch in breadth. It tapers gradually towards the tail, which terminates in two short, blunt, caudal styles. The first or occipital segment of the body is about twice the length of the second. The tentacular cirri are unequal, and vary in length; in the largest and best developed specimen the longest are only about

as long as the first two segments; while in another specimen nearly of the same size they are nearly equal in length to the first four segments, and in one or two small specimens not a third the length of the two just named. These cirri are equal in length to at least eleven of the first segments of the body. The shorter ones are only about half the length of the first segment of the body. The feet are well developed, the superior branchial appendages are large and in the form of a leaf, giving the animal at first sight the appearance of a species of *Phyllodon*. The antennæ are shorter than the palpi, which are strong and conical in shape.—*Hab.* Esquimalt Harbour, Vancouver Island. (*Brit. Mus. Col.*)

This species approaches very nearly to *Nereis virens* from Newfoundland (*vide* Middendorf, Sibirische Reise Anulos 6, tab. i., figs. 2–6).

Nereis bicanaliculata. (Baird.) N. S.

This is rather a small species, about 2 inches long, and 2½ lines in breadth. It is of a dull white colour, and is remarkable for having a channel running down both the dorsal and ventral sides. The channel on the dorsal surface is rather deep, commencing from the eleventh ring, and continues to the tail; the channel itself is quite smooth, the divisions or rings of the body not showing on its surface. On the ventral surface the channel shows marks of the divisions or rings into which the body is divided. The head is small, the antennæ about equal in length to the palpi, and the tentacular cirri are equal to about five or six rings of the body. The upper portion of the body is rounded,

and not channelled; and the tail terminates in a round blunt knob without caudal filaments. The feet are rather small, but are rendered unusually distinct from the peculiar manner in which the rings or divisions of the body are interrupted by the channel running along the centre of the body. It tapers very gradually, and almost imperceptibly for some time, from the head to the tail.—*Hab.* Esquimalt Harbour, Vancouver Island. (*Brit. Mus. Col.*)

Glycera corrugata. (Baird.) N. S.

This annelide is about 4 inches in length, exclusive of the proboscis, which, where exserted, is $\frac{3}{4}$ths of an inch long, and is about 3 lines in breadth; the proboscis is 4 lines at its greatest diameter. The head is rather short and conical, and strongly ringed. The antennæ are somewhat broad. The feet are broad, composed of two lobes, and are destitute of branchial filaments. The bristles are jointed, and the setæ straight and sharp. The segments of the body are very numerous, composed of a double ring, the one on which the feet are set being the narrower of the two, and raised; while the whole surface of the body, especially on the upper side, is densely, though not very strongly, corrugated throughout its whole length. The proboscis is densely scabrous, and covered with very short dark-coloured bristles. The body tapers to a narrow point posteriorly, and terminates in a loosely-connected short lobe, armed at the extremity with a slightly-curved, horny, sharp-pointed claw.—*Hab.* Esquimalt Harbour, Vancouver Island. (*Brit. Mus. Col.*)

Sabellaria saxicava. (Baird.) N. S.

This worm lives in the rock. The tube in which it lodges is solitary, and is evidently hollowed out of the solid (though not a very hard) rock by itself, and appears to be quite round. The thoracic portion of the body is round, the abdominal flattened, with an impressed line running down through its whole length. The head is surmounted by an opercular disc, composed of two rows of stout dissimilar bristles (*paleæ*). The inner row consists of about ten stout cylindrical sharp-pointed bristles of a dark-horn colour, gradually increasing in size from the dorsal margin towards the ventral. The outer row consists of about eighteen bristles, not so stout, flattened, and finely denticulated on both sides for about half the length. The post-occipital segment of the body is long, of a dark colour, somewhat wrinkled, and marked with three or four fleshy tubercles on each side. The thoracic feet are three pairs, and are broad but short. As only one specimen was found, it was thought unadvisable to dissect the whole worm out, in consequence of which the extremity has not been seen. I am unable to say whether it terminates in a caudal appendage or not.

The length of the exposed portion of the worm is $1\frac{1}{2}$ inch, the breadth about 2 lines; probably the part enclosed in the tube may be of about equal length.—*Hab.* Esquimalt Harbour, Vancouver Island. (*Brit. Mus. Col.*)

List of Fishes collected in the Salt- and Fresh Waters of Vancouver Island and British Columbia.

SALMONIDÆ.

Salmo.
purpuratus. (Pallas.)
spectabilis. (Grd.)

Fario.
stellatus. (Girard.)

Fario Lordii. (Nov. Sp.)

(Günther: Fishes, Vol. VI. p. 148.)

Scales minute. Head and body rather compressed; the height of the head equals the length of the head, and is two-ninths of the total (without caudal); the length of the head is one-half of the distance between the snout and the vertical from the origin of the dorsal fin. Snout very obtuse, scarcely longer than the diameter of the eye, which is three-fourths of the width of the interorbital space. The lower jaw is a little shorter than the upper; maxillary of moderate width, scarcely reaching to the vertical from the margin of the orbit. Teeth of moderate strength; those along the medium line of the hyoid are very small. Præoperculum with a very distinct lower limb. Fins rather small; the length of the pectoral is less than that of the head (without snout), or one-half of the distance of its root from the ventrals; caudal fin slightly emarginate. Back and sides reddish olive; sides with numerous round light-coloured spots. Belly whitish, powdered with reddish olive; paired fins and anal colourless; caudal immaculate. Pyloric appendages very long and wide.

'This is one of the smallest species of charr, both our specimens having the abdomen filled with mature ova.'

This very interesting little charr's habits would have been described, when speaking of the Salmonidæ in Vol. I., had it been named as a new species in time. The specimens in the British Museum collection I caught with an artificial fly in a small stream that flows down the west slope of the Cascades, near the Skaget flat, to join the Fraser at Fort Hope.

Salmo.
- paucidens. (Richardson.)
- quinnat (Richardson) (or Semeetlek).
- Scouleri.
- paucidens (or slzoin).
- Gairdneri (or cha-cha-lool).
- lycaodon (or Keasoo, Ekewan, and Kutch-kutch).

Thaleichthys.
- pacificus. (Grd.)

Coregonus.
- quadrilateralis.

Gasterosteus.
- serratus.
- Pugetti.
- concinnus.
- spinachia.

Chirus.
- hexagrammus.
- decagrammus.
- constellatus.

Sebastes.
- paucispinis.
- melanops.

Agonus.
- acipenserinus.

Cottus.
- polyacanthocephalus.
- bubalis.

Centridermicthys.
- maculosus.
- parvus.
- gulosus.
- armatus.
- globiceps.

Platichthys.
- rugosus.

Pleuronectes.
- stellatus.
- umbrosus.
- bilineates.
- hippoglossus?
- digrammus (Günther: *nov. sp.*, Brit. Mus. Cat. Fishes). Vide Vol. I. Flat-fishes.

Pleuronicthys.
- guttulatus. (Grd.)

Malletta.
- cœrulea.

Engraulis.
- mordax. (Grd.)

Syngnathus.
- arundinaceus. (Grd.)

Acipenser.
- transmontamus. Vide Vol. I. Sturgeon fishing.

Chimæra.
- Colleii.

Acanthus.
- Suckleyi.

Fam. Embiotocidæ.*

(Günther: Fishes, Vol. IV. p. 245.)

Body compressed, elevated, or oblong, covered with cycloid scales. Lateral lines continuous. One dorsal fin, with a developed spinous process, and with a scaly sheath along the base, which is separated by a groove from the other scales; anal with three spines and numerous rays. Ventral and thoracic fins with one spine and five soft rays. Tusk in the jaws small; palate smooth. The lower pharyngeal bone triangular. Branchiostegals, five or six. Gills, four pseudo-branchiæ, well developed; air-bladder large, simple. Stomach without cæcal appendage; pyloric appendage, none. Viviparous. Vertebræ 17—20. (*Ditrema aggregatum.*)

Synopsis of Genera.

Dorsal spines . .	7—11 . .	1. Ditrema.
Dorsal spines . .	16—18 . .	2. Hysterocarpus.

Ditrema.

Body compressed, elevated, covered with cycloid scales of moderate or rather small size; mouth rather small; teeth conical, in a single series. One dorsal fin, the spinous portion of which is less developed than the soft, and composed of seven to eleven spines; anal with three spines and numerous closely-set rays. Gills, four, with a cleft behind; pseudo-branchiæ well developed.

Ditrema.	*Ditrema.*
Jacksoni.	Caryi.
laterale.	aggregatum.
Temminckii.	furcatum.
vacca.	brevipinnes (Günther: *nov. sp.* Fishes, Vol. IV.).
toxotes.	

* Vide Viviparous Fishes, Vol. I.

Ditrema brevipinnes. (Sp. ch.)

The three posterior dorsal spines are the longest; a little shorter than the anterior rays. Scales on the cheeks in two series. The length of the body is one-third of the total length (without caudal). Jaws equal in length anteriorly; lips thin, the fold of the lower being interrupted in the middle. The maxillary does not quite extend to the anterior margin of the eye. Length, 7½ inches. Head somewhat longer than high, its length being nearly one-fourth of the total (without caudal). The upper profile is somewhat concave above the eye. The diameter of the orbit equals the extent of the snout, and is two-sevenths of the length of the head; cleft of the mouth oblique; tusk rather small, in a single series. The scaly part of the cheek is narrower than the orbit. The dorsal commences vertically above the root of the ventral; the first spine is very short, the three following increase in length; the three last, being longest, of nearly equal length, half as long as the head; the anterior rays a little longer than the last spine. The anal fin commences below the seventh dorsal ray, and extends further backwards than the dorsal fin, its spines being very distinct; caudal emarginate. Back, dark greenish olive; belly, silvery.

I obtained this little species in Esquimalt Harbour, but it has the same range and general distribution as the others. Vide Vol. I.

Ditrema.	*Ditrema.*
minimum.	Agassizii.
arcuatum.	anale.
megalops.	rhodoterum.

Gen. HYSTEROCARPUS.

Body compressed; oblong; covered with scales of moderate size. Mouth rather small; teeth conical, in a single series. One dorsal fin with from sixteen to eighteen spines; anal, with three spines and numerous rays. Intestinal tract short, with two circumvolutions.

Hysterocarpus.

Traskii.

Cyclopterus orbis. (Nov. Sp.: Günther.)*

(D. 7–19. A. 9.)

The head and body form one orbicular mass, terminating posteriorly in the narrow, short tail. The plates with which the skin is covered are very rough, tubercular, and conically elevated in the centre. A series of large plates runs along the upper orbital edge to the side of the back; two series of smaller ones run along the middle of the interorbital space, and along the base of the dorsal fins. Other large plates occupy the middle of the sides and the lateral part of the belly; the plates on the side of the head, before the pectoral, are only half as large as those described, and those on the tail are smaller. The mouth is transverse, not extending on to the side of the head, and one-half the greatest width of the interorbital space. The ventral disk is shorter than the head, subcircular, entire, and surrounded by fifteen flat papillæ. The caudal fin is of moderate length, rounded, and composed of nine simple rays. Vent nearer to the ventral disk than to the anal fin.

* British Museum Catalogue of Fishes.

Found attached to the bones of a large whale that was washed into Esquimalt Harbour, Vancouver Island.

ECHINEIS. (Species not made out.)

I found a number of these curious sucking fish (with the sucking disk on the top of their heads) attached to the turtle we caught with a hook and line. Vide Vol. I., 'The Voyage.'

GADUS. (Species not determined.)

List of Shells taken on the eastern side of Vancouver Island, dredged in ten fathoms water, and collected from rocks between tide marks.

MURICIDÆ.

Fusus orpheus. (Gould.) Esquimalt Harbour, 8 to 10 fathoms.
— sitkensis. (Gould.) Esquimalt Harbour, between tide marks.
Columbella gausapata. (Gould.) Esquimalt Harbour, 10 fathoms.
Nassa mendica. (Gould.) Esquimalt Harbour, 8 fathoms.

Chrysodomus tabulatus. (Baird: Nov. Sp.)

Testa fusiformi, aspera, confertim lirata, liris inæqualibus, minute squamatis; anfractibus sex seu septem, superne concavoangulatis seu canaliculatis, ultimo magno, trientes duos longitudinis testæ adequante, et antrorsum in canalem flexuosum desinente, saturis distinctis; labro interno super columellam inflecto, umbilicum tegente.

Only one specimen of this species was collected, and it had for some time been the abode of a hermit-crab.

It is of a perfectly fusiform shape, and the upper parts of the whirls next to the suture are flattened and hollowed out into broad channels. The surface is encircled with numerous, close-set, raised striæ, which are of unequal size, every fourth one being larger than any of the intermediate ones, and all roughened by numerous small scales. The whirls are six or seven in number (the upper ones being unfortunately broken off), and rapidly increase in size, the last being two-thirds the length of the whole shell. The columella is covered with a turned-over plate of the inner lip, the umbilicus being partially concealed by it. The lower canal is of considerable length, and is bent to one side. The mouth appears to be rather small in proportion to the size of the shell. When taken, it was inhabited by a species of *Pagurus*, and, as is customary with shells similarly inhabited, was considerably injured by its parasitic tenant. Long. 3 inches; lat. 1⅓ inch.—*Hab.* Esquimalt Harbour. (*Brit. Mus.*)

BUCCINIDÆ.

Murex lactuca. (Esch.) Esquimalt Harbour, between tide marks; very abundant.

Vitularia aspera. (Baird: Nov. Sp.)

Vit.—Testa fusiformi, purpurea, scabra, elongata, longitudinaliter plicato-costata, transversim lirata, liris crebris et minutissime squamatis; anfractibus sex, ultimo trientes duos longitudinis testæ adequante, in canalem rectum, longiusculum, apertum, desinente; columella planulata, fauce albida; labro externo intus

dentato, extus serrato; operculo oblongo, nucleo in margine externo sito.

This shell partakes much of the character of a species of *Murex*; but the oblong operculum, with its nucleus situated on the external edge towards the middle, places it among the *Buccinidæ*. It is of a purple colour; and the surface of the shell is rough, with numerous small scales on the raised striæ which encircle it. The longitudinal plaits or varices are about ten in number, and are least distinct on the last whirl. The mouth is ovate, and the canal of moderate length and straight. Long. 1 inch; lat. ½ inch.—*Hab.* Esquimalt Harbour. (*Brit. Mus.*)

PYRAMIDELLIDÆ.

Murex foliatus. (Lamk.) Esquimalt Harbour, between tide marks.
Purpura emarginata. (Reeve.) Esquimalt Harbour, between tide marks.

Chemnitzia vancouverensis. (Baird: Nov. Sp.)

Testa elongato-turrita, cylindrica, longitudinaliter oblique forte costata; anfractibus novem, ultimo superne indistincte costato, infra lævigato; apertura parva, rotundato-ovato; suturis impressis.

This shell is peculiarly ribbed. The eight upper whirls are strongly and somewhat obliquely ribbed; but on the last, which is the largest, the ribs are indistinct on the upper half, and on the lower half disappear altogether. The interstices between the ribs, which in the penultimate whirl are about sixteen in number, appear smooth. The sutures are deep and well marked. The mouth is rather small, and is somewhat rounded-

ovate. In consequence of its having been in the crop of a duck, the surface of the shell is somewhat eroded, and the apex is broken off. Long. $\frac{1}{4}$ inch.—*Hab.* Esquimalt Harbour. (*Brit. Mus.*)—'Taken from the crop of a pin-tail duck.'—*J. K. Lord.*

LITTORINIDÆ.

Littorina scutulata. (Gould.) Esquimalt Harbour, between tide marks; abundant.

— sitkana. (Phil.) Esquimalt Harbour, between tide marks; abundant.

Amnicola Hindsii. (Baird: Nov. Sp.)

Testa retusa, solidula, viridi-olivacea, minute longitudinaliter undulato-striata, transversim obscure lirata, apice erosa; anfractibus quatuor, ultimo prope medium retuse-carinato, ad suturas canaliculato, suturis impressis; columella albida; apertura cærulescente.

This species resembles somewhat the *Paludina seminalis* of Hinds, but it differs in contour, being bluntly carinate round the middle of the last whirl, and in being channeled round the suture. The surface of the shell is distinctly marked with numerous flexuous striæ, the lines of growth, and near the sutures is rather indistinctly marked with circular striæ. I have named it after a good conchologist, who has described several shells from the West Coast of America, and who obtained the specimens of his shell from the Rio Sacramento, California. Long., largest specimens, nearly $\frac{1}{2}$ inch; lat. rather more than $\frac{1}{3}$ inch.—*Hab.* River Kootanie, and stream at the foot of the Rocky Mountains, British Columbia. (*Brit. Mus.*)

LACUNIDÆ.

Lacuna carinata. (Gould.) Esquimalt Harbour, 10 fathoms of water.

MELANIADÆ.

Melania salicula. (Gould.) From swift streams west of the Cascades.

CERITHIADÆ.

Potamides filosus. (Gould.) Macaulay's Point, at extreme low water.

CALYPTRÆIDÆ.

Crepidula excavata. (Brod.) Esquimalt Harbour, at low water.
— exuviata. (Nutt.) Esquimalt Harbour, in holes bored by Saxicavæ between tide marks.
— unguiformis. (Lamk.) Esquimalt Harbour, and attached to stones between tide marks.
— nummaria. (Gould.) Esquimalt Harbour, and attached to stones between tide marks.
— adunca. (Sowerby.) Esquimalt Harbour, and attached to stones between tide marks.
Calyptræa fastigiata. (Gould.) Esquimalt Harbour, 8 to 10 fathoms water.

TROCHIDÆ.

Ziziphinus annulatus. (Gray.) Macaulay's Point, low water.
— ligatus. (Gould.)
Trochus pollygo. (Martin.) Esquimalt Harbour, collected by Dr. Lyall.
Margarita costellata. (Sowerby.) Macaulay's Point, low water.

FISSURELLIDÆ.

Fissurella crutitia. (Gould.) Macaulay's Point, low water. Many of the fish contained a parasitic worm, Lepidonotus Lordii. Vide Vol. I.

TECTURIDÆ.

Tectura leucophea. (Nutt.) Between tide marks.
— persona. (Esch.)
— patina. (Esch.)
— testudinali. (Nutt.)
— instabilis. (Gould.)
— mitella. (Menke.)
— scutum. (Esch.)
— Cumingii. (Reeve.)
Scurria mitra. (Esch.)

All common along the coast, on rocks between tide marks.

CHITONIDÆ.

Ischnochiton levigatus. (Fat.)
— dentiens. (Gould.) Esquimalt Harbour, dredged 10 fathoms.
Chiton Wosnessenskii. (Midd.)
— muscosus. (Gould.) Rocks between tide marks.
— stelleri. (Gould.) Macaulay's Point.
Tonicia lineata. (Gray.) Dredged 10 fathoms.
Katharina tunicata. (Gray.) Rocks between tide marks.

BULLINIDÆ.

Bullina (*Tornatina*) *eximia.* (Nov. Sp.)

Testa cylindracea, viridi-lutescente, striata; striis minutis, confertis, undulatis; spira concava, excavata; apertura longa, ad basin effusa; labro acuto; columella prope basin subito arcuata.

Two or three specimens of this pretty species of *Bullina* were dredged, with the animals alive, in 12 fathoms water; and several others were taken out of the stomach of a pin-tail duck shot in the harbour. The shell is cylindrical, and minutely striated with numerous flexuous lines. The spire is very short and concavely

excavated; while the aperture is of considerable length, and the columella at the base suddenly arched. Long. ½ inch.—*Hab.* Esquimalt Harbour, Vancouver Island. (*Brit. Mus.*)

HELICIDÆ.

Helix Townsendiana. (Lea.) Sumass Prairie, British Columbia.
— fidelis. (Gray.) Common east and west of the Cascades; occurs 6,000 feet above sea level.
— Dupetit-Thouarse. (Desch.) Sumass Prairie and Vancouver Island.
— villicata. (Forbes.) Sumass Prairie and Vancouver Island.
— Columbiana. (Lea.) Banks of the Fraser River.

SUCCINIDÆ.

Succinea rusticata. (Gould.) Sumass Prairie.

Succinea Hawkinsii. (Baird: Nov. Sp.)

Testa elongato-obovata, tenui, pellucida, nitida, undulato-striata, rubella, intus margaritacea, spira acuta; anfractibus quatuor, convexis, ultimo duos trientes longitudinis testæ adequante, sutura impressa, apertura ovali, inferne effusa.

This shell is of an elegant form, and of a pinkish colour, with the interior of a pearly lustre. It is smooth and shining, but marked with waved striæ of lines of growth. It resembles very much in figure the *Succinea Pfeifferi* of Europe, but is of a still more elegant shape, and of a brighter hue.

I have named it after Lieut.-Col. Hawkins, R. E., Commissioner of the British North-American Boundary Commission. Long. ¾ inch; lat. ⅓ inch.—*Hab.* Lake Osoyoos, British Columbia. (*Brit. Mus.*)

LIMNÆIDÆ.

Lymnea stagnalis. (Linn.) Lake Osoyoos, replaced west of the Cascades by L. Sumassii.

Lymnea Sumassii. (Baird: Nov. Sp.)

Testa elongata, attenuata, cornea, fragili; anfractibus sex, ultimo cæteris duplo majore; apertura mediocri; columella forte plicata; superficie externa, sub lente, creberrime et minutissime decussata.

This species of *Limnæa* approaches *L. elodes* of Say, but is more elongated, more fragile, and has the columella very strongly plicated. The surface of the shell, when seen under a lens of moderate power, is finely decussately striated. It is of a horny colour, and is of an elongated shape. Long., largest, $1\frac{1}{6}$ inch; lat. $\frac{1}{2}$ inch. —*Hab.* Sumass Prairie, Fraser River, British Columbia. (*Brit. Mus.*)

Lymnea megasoma. (Say.) Lake Osoyoos, and streams west of Rocky Mountains.

Physa heterostropha. (Say.) Found only east of Cascades.

Physa Lordi. (Baird: Nov. Sp.)

Testa tenui, majuscula, cornea, tumida, gibbosa, apertura magna; labro acuto, linea alba seu fusca externe notato; superficie externa minutissime decussata; anfractibus sex, duobus primis minutis, nigro tinctis, ultimo tumido, cæteris quadruplo majore.

This species is one of the largest of the genus, and is much swollen and gibbous. The outer lip is generally marked with a streak of brown edged with white, which

mark is left in those specimens which are of older growth, leaving a white callous-looking line of growth edged with brown, nearly in the centre of the last whirl, which is very large, being about four times the size of all the others put together. The two upper whirls, which are very small, are of a black colour. The surface of the shell is finely decussately striated.

The *Physa heterostropha* of Say abounds in the Sumass Prairie, on the Fraser River; but its place seems to be taken on the higher ground towards the Rocky Mountains by the *Ph. Lordi.* Long. from ¾ to 1 inch; lat. from ½ to ¾ inch.—*Hab.* Lake Osoyoos, British Columbia. (*Brit. Mus.*)

Planorbis trivolvis. (Say.) Common west of the Cascades, replaced by P. corpulentis east.
— corpulentis. Abundant in the Osoyoos lakes.

Ancylus Kootaniensis. (Baird: Nov. Sp.)

Testa ovata, cinerea, concentrice striata, vertice antico, obtuso; intus nitida.

The shell is of an ovate form, and is concentrically striated, though the striæ only appear on the lower two-thirds of its surface, the apex being smooth and shining. Internally the shell is shining and somewhat pearly. Long. ¼ inch; lat. ¼ inch.—*Hab.* Rivers Kootanie and Spokan. (*Brit. Mus.*)

VENERIDÆ.

Chione Lordi. (Baird: Nov. Sp.)

Testa minuta, ovato-trigona, nitida, concentrice transversim sulculata, umbonibus prominulis, nitidis-

simis, lunula nulla, extus lutescente seu albidi-olivacea, intus alba, marginibus tenuissime crenulatis; sinu pallii brevi, obtusa.

This shell was taken in considerable numbers from the crop of a pin-tail duck, shot in the harbour of Esquimalt, Vancouver Island.

It is a small species, of an ovate-triangular shape, a smooth shining appearance, and a light olive colour. The surface is concentrically marked with slight grooves. The beaks are prominent and very shining. Internally the surface is white, the margins of the shell very finely crenulate, and the pallial impression short and blunt. Long. nearly ¼ inch; lat. rather less than ¼ inch.—*Hab.* Esquimalt Harbour, Vancouver Island. (*Brit. Mus.*)

Venus rigida. (Gould.) Vancouver Island, mud between tide marks.
Saxidomus squalidus. (Desh.) Vancouver Island, mud between tide marks.

Sphærium (*Cyclas*) *tumidum.* (Baird: Nov. Sp.)

Testa ovato-trigona, tumida, olivacea, conferte transversim concentrice forte costata; umbonibus prominentibus, necnon erosis; interne cærulescente; margine ventrali rotundato.

This shell is of a tumid, swollen figure, and of an ovate-trigonal shape. The colour externally is dark olive, and it is strongly ribbed concentrically. The beaks are prominent, and frequently eroded. The inner surface is of a bluish tint. The ventral or lower margin is rounded. Long. ½ inch; lat. rather more than ½ inch. —*Hab.* Sumass Prairie, Fraser River, British Columbia. (*Brit. Mus.*)

Sphærium (*Cyclas*) *Spokani.* (Baird: Nov. Sp.)

Testa rotundato-ovata, cornea concentrice transversim conferte minute striata, nitida, sublente obsolete punctata; umbonibus rotundatis, obtusis; interne albida; margine ventrali rotundato.

This shell is smaller than the preceding, more rounded, and with more obtuse beaks. The striæ or riblets are much less distinct; the colour is pale horny externally, and white internally. It has a shining appearance; but when examined by the lens, the surface is seen to be indistinctly punctate. The specimens taken from the Spokan River are much larger than those collected in the Kootanie. Long. rather less than $\frac{1}{3}$ inch; lat. rather more than $\frac{1}{2}$ inch.—*Hab.* Rivers Spokan and Kootanie. (*Brit. Mus.*)

TELLINIDÆ.

Tellina nasuta. (Conrad.) Esquimalt Harbour, mud between tide marks.

Lyonsia saxicola. (Baird: Nov. Sp.)

Testa ovato-oblonga, medio gibba, tenui, fragili, antice producta, clausa, postice compressiuscula, hiante; umbonibus magnis, incurvis; epidermide olivacea, striata; margine dorsali rectiusculo, margine ventrali flexuoso, hiante.

This species is the largest of the genus that has yet been discovered. It is of an ovate-oblong shape, gibbous in the centre, produced anteriorly, compressed posteriorly and gaping. The beaks are large and incurved: it is covered with an olive-coloured epider-

mis, which is striated transversely. The ventral margin is gaping and flexuous. This species resembles considerably the *L. navicula* of Adams and Reeve ('Zoology of the Voyage of the Samarang'), from the Sooloo Sea, and might be taken for a very large specimen of it, and, indeed, is considered to be so by Mr. Adams himself, who informed me he had taken identically the same species, as to size, &c., from the seas of Japan. Besides the size, habitat, and place of abode, this species differs from *L. navicula* in the form of the anterior extremity of the shell and the more gaping ventral margin. Owing to the peculiar place of abode (holes in the rocks), it varies considerably in size and form; but in all the specimens which I have seen, ten in number, it does not vary in the produced anterior extremity. The striæ seen on the surface of the epidermis do not appear to extend from it to the shell underneath. It lodges always in holes in the rocks, from which it is very difficult to extract it, without breaking it; for it would appear to take up its abode in a small hole, enlarging it as it increases in size itself. The substance of the shell, without being very thin, is exceedingly brittle; and few specimens were brought over without being cracked across in various places, apparently in the act of drying. The ossicle covering the front of the internal cartilage is strong and well developed. The length of a moderate-sized specimen is about 3 inches, of a large specimen 4½ inches; the breadth from the beaks to the ventral margin is about 2 inches and 2½ inches. —*Hab.* Holes in rocks in Esquimalt Harbour, Vancouver Island. (*Brit. Mus.*)

CARDIIDÆ.

Cardium corbis. (Mart.) Esquimalt Harbour, dug from sand between tide marks; grows to a great size, and is an important article of Indian diet.

Leda fossa. (Baird: Nov. Sp.)

Testa elongata, ovali, antice multo breviore, rotundata, postice elongata, in rostrum subacutum producta, transversim undulato-costata, in latere antico fossa transversa notata; umbonibus prominulis, margine ventrali rotundato; intus lævi; epidermide tenui, lutescente, nitida induta.

This little shell is of an elongate form, much reduced posteriorly; and near the anterior extremity it is marked by a longitudinal depression or pit, upon which the ribs are nearly obsolete. Long. rather more than $\frac{1}{8}$ inch; lat. rather less than $\frac{1}{8}$ inch.—*Hab.* Esquimalt Harbour, Vancouver Island; dredged in from 10 to 15 fathoms water, by Dr. Lyall, of H.M.S. 'Plumper.' (*Brit Mus.*)

PHOLADIDÆ.

Teredo fimbriata. (Jeff.) Nai-ni-mo Harbour; very destructive to wood piles. Some pieces of wood in British Museum are honeycombed, and only under water 4 months.

SAXICAVIDÆ.

Saxicava rugosa. (Lamak.) Esquimalt Harbour, between tide marks.

Crassatella Esquimalti. (Baird: Nov. Sp.)

Testa parva, cordato-trigona, crassiuscula, olivacea, transversim undato-plicata, antice producto-rotundata,

postice subtruncata, margine ventrali rotundata, umbonibus prominulis, lunula longe caudata.

This species approaches very much in sculpture to the *C. corrugata* of Adams and Reeve ('Zoology of the Voyage of the Samarang'), from the Sooloo Sea, but differs very much in shape. The peculiar undulate plications are chiefly discernible near the umbones, the plicæ or ribs on the lower third of the shell being plain. The beaks are nearly central and prominent; the anterior extremity is somewhat produced, while posteriorly the shell is somewhat truncate. Long. rather more than $\frac{1}{3}$ inch; lat. nearly $\frac{1}{2}$ inch.—*Hab.* Esquimalt Harbour, Vancouver Island. (*Brit. Mus.*)

UNIONIDÆ.

Anodonta cognata. (Gould.) Very abundant east and west of the Cascades.

Alasmadonta angulata. (Say.) Columbia River, Fort Colville, not strictly in British Columbia.

MYTILIDÆ.

Mytilus trossulus. (Gould.) Abundant, rocks between tide marks.

— californiensis. (Conrad.) Abundant, grows to an immense size, sought as an article of diet by the Indians along the Vancouver Island coast.

Nucula lyalli. (Baird: Nov. Sp.)

Testa ovato-triangulari, tumida, crassa, umbonibus prominulis, antice breviore, subrostrata, postice declivi, elongata, margine ventrali rotundato, epidermide olivacea induta, longitudinaliter utrinque costata, costis fortibus, medio divaricatis; intus margaritacea; margine

ventrali subcostato; dentibus anticis ad numerum undecim, posticis novemdecim.

This very interesting species is the fourth of this peculiar divaricately ribbed group which has been discovered in a recent state. The three others are *Nucula divaricata* and *N. castrensis* of Hinds, and *N. mirabilis* of Adams and Reeve. This species approaches very nearly to the fossil species from the Crag, *N. cobboldiæ*, but differs from it in being less transversely ovate, in having the beaks more prominent, the posterior row of teeth in the hinge fewer in number (in *N. cobboldiæ* they are 22), and in the costations being stronger in proportion to the size of the shell, and much fewer in number. It was with some hesitation that I decided upon describing it as a new species; but these marks, the size, and the habitat all induce me to consider it as distinct. I have named it after Dr. Lyall, of H.M.S. 'Plumper,' who has sent us only one specimen. Long. rather more than ½ inch; lat. rather more than ½ inch. — *Hab.* Esquimalt Harbour, Vancouver Island; dredged by Dr. Lyall, H.M.S. 'Plumper,' in from 8 to 10 fathoms. (*Brit. Mus.*)

PECTENIDÆ.

Pecten hericius. (Gould.) Esquimalt Harbour, 8 to 10 fathoms water.
Hinnites giganteus. (Gray.) Rocks between tide marks.

OSTRIDÆ.

Ostrea edulis. (Lamk.) Abundant along the island and mainland coasts.
Placunanomia cipio. (Gray.) Rocks between tide marks.

List of Diatomaceæ from Gatherings in British Columbia and on the shores of Vancouver Island. Kindly classed for me by Dr. Wilson. (119 *Species.*)

Fam. i. *Eunotieæ.*

Epithemia turgida. Columbia River; Pend'Oreille River; Lake Osoyoos; Cow Creek.
— proboscidea. Columbia River.
— granulata. Columbia River; Pend'Oreille River; Lake Osoyoos.
— gibba. Pend'Oreille River; Cow Creek; Lake Osoyoos.
— sorex. Columbia River.
— argus. Pend'Oreille River; Lake Osoyoos.
— ventricosa. British Columbia.
Eunotia arcus. Tributary of Kootenay River; Tobacco River; Spokan River.
— arcus (var.) Tributary of Moyee River; Pend'Oreille River.
Himantidium arcus. Columbia River.
— bidens. British Columbia.

Fam. ii. *Meridieæ.*

Meridion circulare. Tributary of Kootenay; Tobacco River; Cow Creek.
— constrictum. Pend'Oreille River.

Fam. iii. *Licmophoreæ.*

Podosphenia Ehrenbergii *m.* 10 fathoms. Vancouver Island.

Fam. iv. *Fragillarieæ.*

Odontidium Harrisonii. Pend'Oreille River; Cow Creek; tributary of Kootenay; Tobacco River.
— hyemale. Tributary of Kootenay River; Moyee River; Tobacco River.
— mesodon. Source of Tobacco River.
Nitzschia sigmoidea. Cow Creek.
— amphioxys. Cow Creek.
— minutissima. Tributary of Kootenay.
— angularis *m.* Vancouver Island.
— sigma *m.* 10 fathoms. Vancouver Island.

Fam. v. *Surirellecæ.*

Synedra affinis *m.* Shores of Vancouver Island.
Cymatopleura solea. Columbia River; Pend'Oreille River.
— elliptica. Columbia River.
Surirella biseriata. Columbia River.
— splendida. Columbia River.
— gemma *m.* Vancouver Island.
Campylodiscus costatus. Columbia River.
— parrulus *m.* Vancouver Island.
— striatus *m.* Vancouver Island.

Fam. vi. *Striatellecæ.*

Rhabdonema arcuatum *m.* Shores of Vancouver Island, and at 8 fathoms.
Tabellaria fenestrata. Spokan River.
Grammatophora marina *m.* Shores of Vancouver Island.
— mexicana *m.* Shores of Vancouver Island.
— serpentina *m.* Shores of Vancouver Island.
— serpentina (var. *β*). Smith *m.* Vancouver Island.
Gephyria media *m.* Vancouver Island.
Eupleuria pulchella *m.* Vancouver Island.

Fam. vii. *Melosireæ.*

Cyclotella Dallasiana. Columbia River.
— operculata. Tributary of Kootenay River.
Hyalodiscus lævis *m.* Vancouver Island.
— subtilis *m.* Shores of Vancouver Island.
Podosira hormoides *m.* Shores of Vancouver Island, and at 8 fathoms.
Melosira orichalcea. Columbia River; Pend'Oreille River; Lake Osoyoos.
— marina *m.* Vancouver Island.
— nummuloides *m.* Vancouver Island.
— varians. Pend'Oreille River; Cow Creek; Spokan River.
— subflexilis. Columbia River.

Fam. viii. *Coxinodisceæ.*

Coxinodiscus radiatus *m.* Shores of Vancouver Island.
— ovulus iridis *m.* Vancouver Island.

Fam. viii. Coxinodiscæ—*continued.*
Coxinodiscus subtilis *m.* Shores of Vancouver Island.
Actinocyclus undulatus *m.* Vancouver Island.
— subtilis *m.* Vancouver Island.
Actinoptychus senarius *m.* Vancouver Island.
Arachnoidiscus Ehrenbergii *m.* Vancouver Island, at 8 fathoms.

Fam. ix. *Eupodisceæ.*

Auliscus cœlatus *m.* Vancouver Island.

Fam. x. *Biddulpheæ.*

Biddulphea aurita *m.* Shores of Vancouver Island, and at 8 fathoms.
— tumida *m.* Shores of Vancouver Island, and at 8 fathoms.
— lævis *m.* Vancouver Island.
Isthmia nervosa *m.* Vancouver Island.

Fam. xi. *Anguliferæ.*

Triceratium Monterayii *m.* Vancouver Island.
Amphitetras antediluviana *m.* Vancouver Island.

Fam. xii. *Chætocereæ.*

Chætoceros incurvum *m.* Vancouver Island.

Fam. xiii. *Cononeideæ.*

Cononeis placentula. Columbia River; Pend'Oreille River; tributary of Kootenay.
— pediculus. Tributary of Kootenay.
— Thwaitesii. Columbia River.
— pseudomarginata *m.* Shores of Vancouver Island, and at 10 fathoms.
— distans *m.* Vancouver Island, at 10 fathoms.
— concentrica *m.* Vancouver Island.
— scutellum *m.* Vancouver Island.
— diaphana *m.* Vancouver Island.
— splendida *m.* Vancouver Island.
— dirupta *m.* Vancouver Island.
— nigrescens (Greville). New species. Vancouver Island.
— oregana (Greville). New species. Vancouver Island.

Fam. xiv. *Achnantheæ.*

Achnanthidium lanceolatum. Pelouse; Cow Creek; tributary of Kootenay.
Achnanthes brevipes *m.* Shores of Vancouver Island, and at 8 fathoms.
— exilis. Cow Creek.

Fam. xv. *Cymbelleæ.*

Cymbella maculata. Tributary of Kootenay River.
— Ehrenbergii. Columbia River.
Cononema cymbiforme. Kootenay River; Pend'Oreille River.
— lanceolatum. Columbia River; Kootenay River; Spokan River; Lake Osoyoos.
— lanceolatum, var. cornutum. Columbia River.
— cistula. Columbia River.
Amphora ovalis. Columbia River; Pend'Oreille River; Cow Creek.
— ventricosa *m.* Vancouver Island.

Fam. xvi. *Gomphonemeæ.*

Gomphonema marinum *m.* Shores of Vancouver Island, and at 10 fathoms.
— dichotornum. Tributary of Kootenay River; Spokan River.
— curvatum. Tributary of Kootenay River.
— geminatum. Columbia River; tributary of Kootenay River.
— capitatum. Kootenay River.
— Herculaneum. Columbia River; Spokan River; Cow Creek.
— acuminatum. Pend'Oreille River.
— tenellum. British Columbia.
— constrictum. Lake Osoyoos.

Fam. xvii. *Naviculaceæ.*

Navicula dicephala. Tributary of Kootenay River.
— rhomboides. Tributary of Kootenay River; Columbia River; Moyee River.
— elliptica. Tributary of Kootenay River; Lake Osoyoos; Pend'Oreille River.
— maxima. Columbia River.
— gibberula. Columbia River; Pend'Oreille River; Cow Creek.
— didyma *m.* Shores of Vancouver Island, and at 8 fathoms.

Fam. xvii. Naviculaceæ—*continued.*

Navicula crabro *m.* Vancouver Island.
— leptogongyla. Cow Creek.
— Smithii *m.* Vancouver Island, at 10 fathoms.
— rhombica *m.* Vancouver Island.
— varians. Lake Osoyoos.
Stauroneis pulchella *m.* Shores of Vancouver Island, and at 10 fathoms.
— phœnicentron. Source of Tobacco River.
— anceps. Columbia River.
— gracilis. Pend'Oreille River.
Pleurosigma formosum *m.* Vancouver Island, at 10 fathoms.
— speciosum *m.* Vancouver Island.
— intermedium *m.* Vancouver Island.
— naviculaceum *m.* Vancouver Island.
— fasciola *m.* Esquimalt Harbour.

Fam. xviii. *Actiniscecæ.*

Dictyocha gracilis *m.* Shores of Vancouver Island, and at 8 fathoms.
— fibula *m.* Shores of Vancouver Island.
Mesocena elliptica *m.* Vancouver Island.

THE END.

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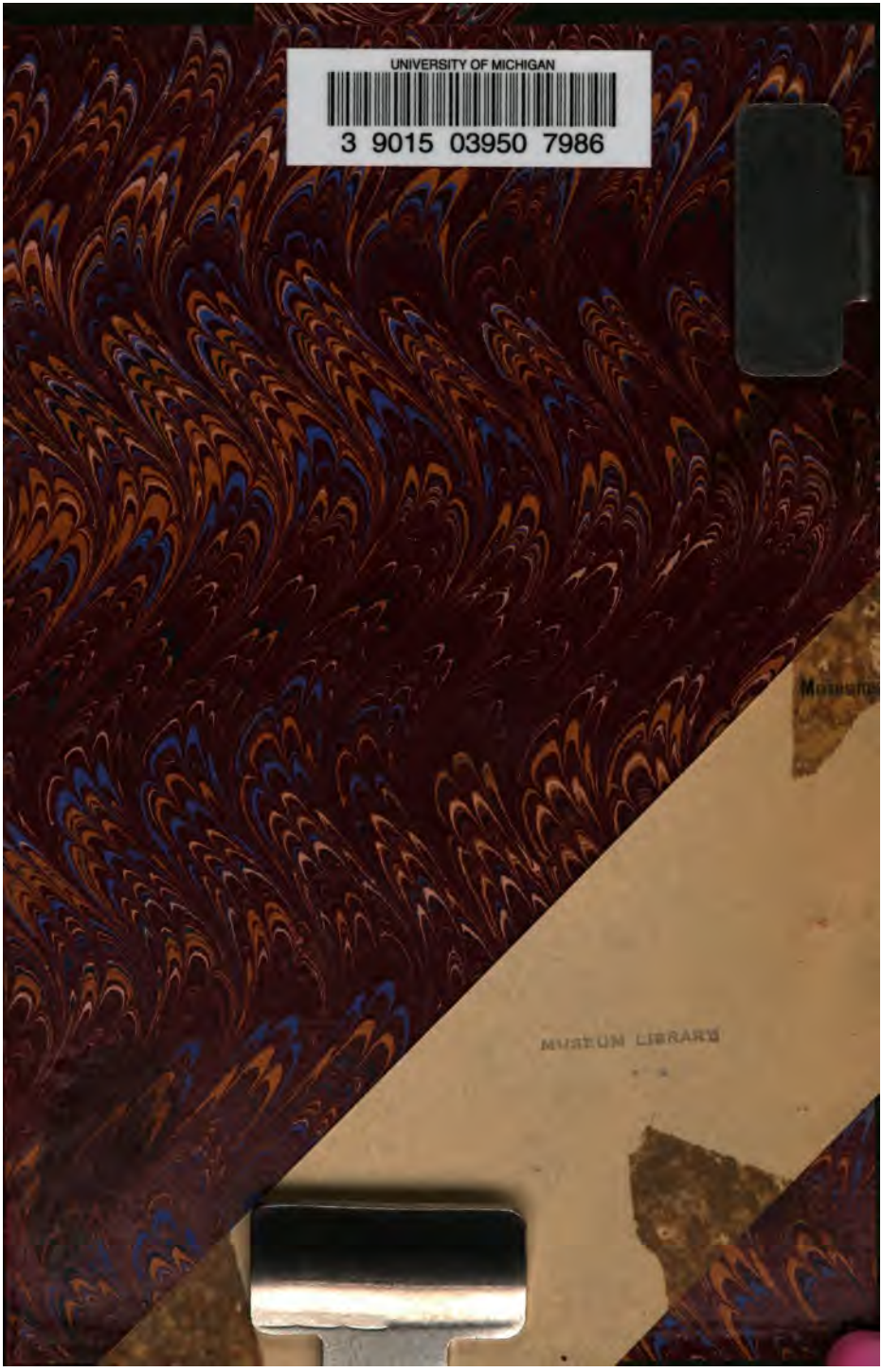
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